NYASALAND PROTECTORATE

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ANNUAL
MEDICAL & SANITARY REPORT

For the year ending 31st December, 1939.

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SECTION I. ADMINISTRATION.

(A) STAFF.

The staff sanctioned for the year 1939 was:—

(a) European.

Director of Medical Services.
Two Senior Medical Officers.
Medical Entomologist.
Pathologist.
Fourteen Medical Officers.
Matron.
Twelve Nursing Sisters.
Two Health Inspectors.
Office Superintendent and Medical Storekeeper.
Clerk.

(b) Asiatic.

10 Sub-Assistant Surgeons.

(c) African.

12 Clerks.
1 Senior Hospital Assistant.
10 Hospital Assistants, 1st Grade.
5 Junior Hospital Assistants.
1 Laboratory Assistant, 1st Grade.
21 Dressers, 2nd Grade.
1 Sanitary Inspector, 1st Grade.
3 Sanitary Inspectors, 2nd Grade.

A varying number of 3rd grade and ungraded dressers, junior laboratory assistants, native nurses, hospital and dispensary servants, medical store assistants, packers, messengers, 3rd grade and ungraded sanitary inspectors, vaccinators, rural sanitary inspectors and sanitary labourers. The average number employed during the year were dressers 215, junior laboratory assistants 10, native nurses 39, hospital and dispensary servants 285, messengers, medical store assistants, packers, etc. 19, sanitary inspectors 15, vaccinators and rural sanitary inspectors 32, sanitary labourers ; a fluctuating number according to need.

Appointments.

(a) Europeans.

	Date.
Dr. O. N. Ransford, Medical Officer	13- 1-1939.
Dr. J. O. Creighton, Medical Officer	5- 5-1939.
Miss M. J. C. MacDonald, Nursing Sister	2-12-1938.
Miss E. B. L. Calder, Nursing Sister	5- 5-1938.
Miss H. S. Evans, Nursing Sister	11- 8-1939.
Miss E. A. Barker, Nursing Sister	25- 8-1939.
Miss E. Carr, Clerk and Stenographer (Temporary)	1- 4-1939.

(b) Asiatics—Nil.

(c) Africans—Nil.

Promotions.

Dr. H. G. Fitz-Maurice, Medical Officer, to be Senior Medical Officer, with effect from 6-1-1939.

Dr. H. M. Shelley, Pathologist, to be Senior Medical Officer, Tanganyika Territory, with effect from 20-6-1939.

Dr. C. H. Howat, Medical Officer, to be Civil Surgeon, Aden, with effect from 7-7-1939.

Hospital Assistant 1st Grade, Dan. S. Ngurube to be Senior Hospital Assistant, with effect from 1-10-1939.

Dresser 2nd Grade, Elias D. Sisya to be Junior Hospital Assistant as from 1-11-1939.

Clerk 2nd Grade, J. Grayson Kapondah to be Clerk 1st Grade as from 1-7-1939.

Transfers.

Dr. T. A. Austin, Senior Medical Officer, transferred to Tanganyika Territory, with effect from 6-1-1939.

Dr. H. M. Shelley, Pathologist, transferred to Tanganyika Territory as Senior Medical Officer, with effect from 20-6-1939.

Dr. D. A. Skan, Medical Officer, transferred from Tanganyika Territory as Pathologist, with effect from 3-11-1939.

Dr. C. H. Howat, Medical Officer, transferred to Aden as a Civil Surgeon, with effect from 7-7-1939.

Miss S. Barber, Nursing Sister, transferred to Malaya, with effect from 20-9-1939.

Mr. V. T. Smithyman, Clerk, transferred to Customs Department, with effect from 11-4-1939.

Retirements.

Miss H. M. Phillips, Nursing Sister, retired from the service with effect from 5-6-1939.

Resignations.

Miss E. Irving, Nursing Sister, with effect from 30-7-1939.

Mr. P. B. Wesley Mlanga, African Clerk, 1st Grade, from 19-10-1939.

Reversion to Military Duty.

Jemadar S. S. Pannum, Sub-Assistant Surgeon, reverted to duty with the Indian Medical Department with effect from 3-6-1939.

Secondments to Armed Forces.

Dr. D. P. Turner, Medical Officer, with effect from 4-9-1939.

Dr. O. N. Ransford, Medical Officer, with effect from 30-10-1939.

Dr. J. O. Creighton, Medical Officer, with effect from 28-12-1939.

Hospital Assistant 1st Grade, Dyson David with effect from 29-9-1939.

,, ,, Junior, Sydney Kandulu with effect from 29-9-1939.

In addition to the above, Sixteen Dressers, 3rd Grade and Ungraded, have been seconded for duty with the Armed Forces.

Deaths.

Nil.

(B). LIST OF ORDINANCES, ETC: ENACTED DURING 1939 AFFECTING PUBLIC HEALTH.

Ordinances.

Nil.

Rules, Orders, Notices, etc.

25- 4-1939.	The Public Health Ordinance, Cap. 73, Vaccination Post Rules, 1938.
28- 7-1939.	The Townships Ordinance, Cap. 21, Amendment to Fort Johnston Township Bye-Law, 1939.
24-10-1939.	The Education Ordinance, Cap. 19, School Buildings Rules 1939 applied.

(C). FINANCIAL.

2. The total expenditure for 1939 was £52,343 10s. 1d. a decrease of £495 10s. 2d. on that of 1938. The approved expenditure for the Department for 1939 was £55,684 plus £410 for Lilongwe European Hospital Surgical Equipment and Apparatus (Special Expenditure). An analysis of the expenditure of the Department for the year revealed the following figures :—

	£	s.	d.
(i) Expenditure on Central Administration, indivisible expenditure, salaries, transport, passages, etc.	13,793	17	8
(ii) Expenditure on native services ...	28,502	4	2
(iii) Expenditure on non-native services ...	10,047	8	3
Total ...	£52,343	10	1

3. The total revenue of the Department was £1,871 14s. 10d. the amount being made up as follows :—

	£	s.	d.
(*a*) Hospital fees	1,655	17	8
(*b*) Sale of stores	159	3	2
(*c*) Pathological fees	26	5	0
(*d*) Radiological fees	30	9	0

4. From the Unallocated Stores, 7,473 bottles of 100 tablets of dihydrochloride of quinine and 3,736 packets of quinine bisulphate were sold to the general public, the amount realised being £1,261 1s. 4d. In 1938 the amount realised from the sale of quinine was £1,177 1s. 11d.

5. The actual details of the expenditure of the Medical Department for 1939 are as follows :—

	£	s.	d.
Approved expenditure, 1939	56,094	0	0
Actual expenditure, 1939			
(*a*) Personal emoluments	33,271	2	9
(*b*) Other charges	18,694	17	4
(*c*) Special expenditure :			
European Hospital, Lilongwe—surgical equipment and apparatus ...	296	11	3
Refrigerators for Blantyre European Hospital	80	18	9
	£52,343	10	1

7 Of the amount expended through the votes of the Medical Department, the sum of £1,487 11s. 9d. was devoted to the maintenance of routine sanitary services under which are included, night soil collection and disposal, refuse collection and disposal and bush and grass cutting in townships, sanitary areas and Boma stations. The maintenance of routine sanitary services can hardly be considered a fair charge against the votes of the Medical Department and therefore in estimating the expenditure on Medical Services, this amount should be deducted making the total expenditure on Medical Services over the year £50,855 18s. 4d.

SECTION II PUBLIC HEALTH.

(A). GENERAL REMARKS.

The War and its Effect on the Department.

7. The declaration of war with Germany on September the 3rd found the Medical Department not only ready to deal with local emergencies, but prepared to co-operate with the medical services of other British territories to the north and the west in providing medical personnel, and some stores, for medical units to military forces. Since the outbreak of war this Department, besides providing medical stores, has seconded or engaged for military service outside the Protectorate, European and African staff as follows:—

Europeans	...	3 Medical officers
Africans	...	2 Hospital assistants
	...	16 Dressers
	...	20 Stretcher bearers
	...	7 Wagon orderlies
	...	2 Clerks
	...	2 Cooks
	...	3 Batmen
	...	1 Carpenter.

At the close of the year the Department had undertaken the engagement and partial training of certain further African personnel required for military service.

8. The Department has, in addition, continued to provide medical services for military units maintained in the country and carried out the medical examination of all new recruits for the Army. All this extra work has been undertaken by officers of the Department without any special remuneration and in addition to their ordinary duties. The Medical Officer working at Medical Headquarters as personal assistant to the Director, has assumed the duties of D.A.D.M.S. to Army Lines of Communication while continuing work in his civil capacity.

9. The secondment of medical staff from a small service has naturally affected the working of the Department but up to the present it has been found possible to maintain health services to at least pre-war levels.

10. Arrangements are being made by Government to solve our difficulties with regard to the provision of leave periods for staff, by the granting of short spells of leave at more frequent intervals to be spent in South Africa in lieu of long leave periods ordinarily spent in Great Britain or outside Africa. This will cause a smaller quota of officers being away on leave at any one time than is usual.

11. The withdrawal of African dressers has necessitated the closing of only three dispensaries, those closed being in areas, where, for various reasons, little work has been done for some years. The desirability of closing these dispensaries would have been considered even if war had not occurred.

12. Increases in the strength of the military maintained in Zomba, either for garrison duty or for posting to service battalions, has caused some overcrowding in the African hospital in this town but arrangements are already in hand for the provision of extra ward accommodation at the hospital, funds being provided from military votes.

13. Up to the end of the year no special arrangements had been made between the local Government and the military on the important question of the maintenance of military personnel in civil hospitals, but it is understood that the question is receiving general consideration at Army Headquarters, for it affects all British territories in East Africa. In the meantime by local arrangement, the army authorities provide for the feeding of all African army personnel admitted to civil hospitals by issuing rations to the hospitals.

The Report of the Royal Commission on Closer Union.

14. The Royal Commission appointed by His Majesty, to enquire into and report on the desirability of closer union between Southern and Northern Rhodesia and this Protectorate, issued its report in 1939.

15. The Commission recommended that the amalgamation of Northern Rhodesia and Nyasaland should be brought about without undue delay and that all avenues should be explored for the closer linking of these two territories with Southern Rhodesia with a view to future amalgamation. No definite directions have yet been given by the Secretary of State for the Colonies on these recommendations, but the possibility that amalgamation may come about within the next few years has naturally had to be taken into consideration, when matters affecting the development of the medical services of this country have been discussed with Government.

16. A memorandum prepared at the request of His Excellency the Governor on the subject of amalgamation of local medical services with those of Northern Rhodesia has been submitted to Government. In view of the fact that both services are to-day part of the colonial medical services, amalgamation should not prove difficult and benefit both services and Governments.

Visit of Chief Medical Adviser.

17. Dr. A. J. R. O'Brien, C.M.G., M.C., Chief Medical Adviser to the Secretary of State for the Colonies, visited this country in January. Despite the fact that a few days prior to his arrival in this country he was involved in an unfortunate accident, while flying in Northern Rhodesia, in which he suffered some injuries, and also despite the fact that his visit here coincided with the peak of our rainy season, he visited a number of stations and covered a large part of the country and saw much of the activities of our Medical Department, its shortcomings and achievements.

18. The benefit that must accrue to all concerned from visits paid to Colonies by officers in positions of responsibility in the Colonial Office cannot be overstated. It is with considerable regret that officers of the Medical Department have heard of his recent death after only a short illness. We all feel that we have lost a sincere and valuable friend personally and officially.

Visit of the Secretary to the B.E.L.R.A.

19. In June Dr. E. Muir, C.I.E., Secretary to the British Empire Leprosy Relief Association, visited the country and in a conducted tour lasting a fortnight saw all except the two most northerly of our leper centres and spent some time in a rural area inspecting the village populations and obtaining first-hand knowledge of the conditions under which these populations actually live. In the course of this rural tour he saw a number of lepers living in their home circles.

20. Dr. Muir's visit did much to stimulate interest in our leprosy problems and his examinations of lepers detained in leper institutions provided object lessons to doctors and nurses in charge of such stations. His report on his findings and the recommendations he made for future action, has received the careful consideration of Government and, it is hoped, that in spite of the outbreak of war, action will be possible in the near future to put our leprosy control measures on a sounder footing.

Survey of Health and Medical Services.

21. A memorandum prepared by the Director of Medical Services on the medical and health services of this country, in which was included recommendations for the future development of the Department, was submitted to Government early in the year. The memorandum was considered by the Native Welfare Committee and later by Executive Council and was forwarded during the course of the year to the Secretary of State for the Colonies with a covering dispatch by His Excellency the Governor. Communications received by this Government indicate that the dispatch and memorandum are receiving the close consideration of the Secretary of State for the Colonies.

Nutrition Survey.

22. The Nutrition Survey which was begun in August, 1938, under the direction of Dr. B. S. Platt, an officer seconded from the Medical Research Council, assisted by a team which included an Anthropologist provided by the African Institute of Languages and Cultures, a Nutritional Investigator, specially appointed by this Government, a Botanist and Secretary provided by the Medical Research Council, a Senior Medical Officer and an Agricultural officer seconded from the Nyasaland Government, continued its observations throughout the year although in the first instance the survey was planned to cover a period of 12 months only.

23. The survey, even though planned in the first instance on what was thought to be very comprehensive lines, had to have its scope increased during the year for Dr. Platt found that he required specialised help for enquiries into fields which had not been thought necessary in the first instance.

Appointment of Economic Botanist.

24. The first important addition to the scope of the survey was made by the appointment of an Economic Botanist. The officer appointed was Dr. G. A. C. Herklots who arrived in this country in January and left on the 6th of August. On leaving, he spent some time at the Amani Institute in Tanganyika where he studied botanical collections he had made locally.

Fishery Survey.

25. The next important addition was the appointment of a team to undertake a survey of the fishery resources of Lake Nyasa and the other waters of the Protectorate. This survey was placed under the direction of Miss C. K. Ricardo, D. Sc., who was assisted by Miss E. Trewavas, whose services were lent by the British Museum (Natural History) and a local Administrative officer, Mr. H. J. H. Borley, who had previous experience in marine biology.

26. The Fishery Survey party arrived in this country in January, 1939, and having made considerable collections and exhaustive examinations of local fishing methods and practices, returned to England in September with the intention of studying in that country the material collected. It was hoped that when this was completed that at least Miss Ricardo would return to continue observations locally.

27. Miss Ricardo's return has unfortunately been made impossible by the outbreak of war but Mr. Borley will continue the observations required for the completion of the survey. Mr. Borley, at the moment, is in England where he is spending a part of his leave studying matters which have a bearing on the production, preservation and sale of fish.

Reports of Survey Teams.

28. The report of the Fishery Survey has not yet been published but we understand its publication is to be expected in the near future.

29. The work of the main survey is, at the time of writing, nearing completion and Dr. Platt is preparing his report. It is almost unnecessary here to state that the publication of Dr. Platt's report is awaited anxiously for there is little doubt that the Survey party's observations and recommendations will considerably affect the future policy of this country in all matters affecting the nutrition and development of our native population.

Experimental Works by Nutrition Survey Party.

30. The Nutrition Survey party besides carrying out observations during the year undertook the experimental development of an area in the Highlands of the Kota Kota district where they tried out, by methods strictly within the capacity of the local native population, several measures which demonstrate better land usage, the conservation and use of water for irrigation purposes, improved production of local foodstuffs, the growth of new foodstuffs, re-afforestation and prevention of soil erosion. The experimental programme also included an attempt to stock ponds, made in the experimental area, with fish brought up from the Lake-shore.

31. The experiments conducted have proved a great success and, in addition to being an object lesson to Government officials, Native Authorities and others of what can be done by a small team of enthusiasts working in the closest co-operation, have trained a number of African workers for employment in further demonstration or developmental programmes.

The Continuance of the Work of the Nutrition Survey.

32. With assistance obtained from the Colonial Development Fund, Government has arranged for the continuance of observations on lines adopted by the nutrition and fishery surveys and for an intensive effort to develop the Kota Kota district by measures directed to the improvement of the nutrition of its people. The programme of development has been planned on very wide lines and covers such diverse subjects as soil conservation, prevention of soil erosion, re-afforestation, introduction of new food crops, water conservation, irrigation of crops, improved methods of fishing, fish preservation and marketing, stocking of upland waters with fish, improvement of cattle, sheep, goats and poultry, use of animal transport, improved housing, child-welfare and ante-natal centres, maternity centres, homecrafts and labour-saving devices.

33. The developmental programme is to be directed by the District Commissioner, who will be assisted by officers ordinarily provided in the district, and by others specially engaged or seconded. The team under the District Commissioner will include the following:—

Two Assistant District Officers (one in excess of normal postings).

District Medical Officer.

An Agricultural Officer (not normally provided in the district. To be paid for out of Colonial Development funds).

A Nutritional Investigator (to be paid for out of Colonial Development funds).

A European Clerk (not ordinarily provided. To be paid for out of Colonial Development funds).

The team will have assistance as required from the Provincial Veterinary and Forestry Officers.

34. The Kota Kota district divides naturally into two areas, namely, the Highlands and Lake-shore, and the Assistant District Officers will each control development in one area. The Assistant District Officer who is provided for the Lake-shore area is Mr. Borley who was a member of the Fishery Survey and will, therefore, be in a position to follow up that Survey's investigations and to direct measures which are recommended for the improvement of local fisheries.

35. The Government has been fortunate to retain the services of Miss Barker, the nutritional investigator with the survey party, who has shown that besides being a skilled observer she also possesses the faculty of gaining the confidence of our African women.

36. The European clerk has been specially provided to free the District Commissioner and his assistants from as much office routine as possible permitting them to give more time than has been possible in the past to touring the rural areas and making contacts with village populations. The success of the whole programme of development is very dependent on the contact that can be maintained between the Administration, Native Authorities and people.

37. While the Kota Kota programme will constitute the country's main endeavour to prove that by the co-operative efforts of a number of officers considerable improvements can be brought about in a short period in the welfare of our African people, other attempts are also to be made elsewhere in the country, without special assistance, to educate the population on lines already tried out by the Nutrition Survey party. These further efforts are to be made in highland areas of Ncheu, Dowa and Dedza districts.

Conference of Directors of Medical Services of Southern and Northern Rhodesia and Nyasaland.

38. On the 17th of May the Directors of Medical Services of Southern and Northern Rhodesia and this Protectorate met in conference at Salisbury to discuss, primarily, the feeding of African manual workers and reached an agreement on scales of diet to be recommended to their respective Governments. The conference also discussed the housing of labourers but did not formulate an agreed policy.

Issue of Booklet on Feeding and Housing of Labourers.

39. Following this conference a memorandum on the feeding and housing of native employees was prepared by the Director of Medical Services and submitted to Government. The Director's memorandum was accepted by His Excellency the Governor, who himself wrote a preface commending its contents to the public and authorised its issue in the form of a booklet. The booklet was widely circulated in the Protectorate, all known employers of labour being sent copies.

Plague.

40. Cases of bubonic plague were discovered in this country after an interval of twenty years. The number of human cases was small, but the occurrence of these cases led to the discovery that the infection had existed for some time in the field rodent population. Action taken was successful in preventing the occurrence of further human cases. Although investigations made proved that the field rodents were not affected over a large area, we are left wondering whether the epizootic will spread or tend to die out. No information is available as to how the disease entered the Protectorate for investigations made at our request in adjacent territories produced no evidence of any recent rodent infection.

Trypanosomiasis.

41. During the year the Medical Entomologist and the Medical Officer, Kota Kota district, made a survey of the people living in contact with tsetse fly in that district but could find no persons infected.

42. Cases of sleeping sickness amongst persons resident in the Kasungu district were reported during the year and steps are being taken to have the population of this district surveyed. The survey will be made early in 1940.

Retirement of Dr. W. A. S. Lamborn, O.B.E.

43. Dr. W. A. Lamborn, O.B.E., is due to retire early in 1940 and went on leave prior to retirement at the end of the year. At the moment it is not proposed to replace him, but it is hoped that Government will find itself in a position before long to provide an Entomologist for the Department. The efficiency of the Department will be reduced while it is without an Entomologist. The important part the Entomologist plays in Departmental activities will be apparent on reading Dr. Lamborn's annual report.

44. Dr. Lamborn joined the service of this country in December, 1921, and the record of the work he has done here makes wonderful reading. While he has served this Department, he has added much to the knowledge of the world at large on the transmission of disease by insects and the habits of such insects. To-day a report issued under his name receives world-wide attention. His retirement will be a loss to this country and Africa as a whole.

Medical Training School.

45. In spite of delays that have occurred from various causes, the building to provide class-rooms and sleeping accommodation for eighteen males and an equal number of females to be trained as dressers and nurses at the African Hospital, Zomba, is nearing completion. Arrangements have already been made to put the building into use as soon as it is ready.

European Hospital, Lilongwe.

46. The cottage hospital for Europeans at Lilongwe which was reported to be under construction in last year's annual report was completed and opened early in September. The hospital has accommodation for four patients, but at times had to admit a larger number. The one nursing sister posted to this unit has been overworked and Government is taking steps to provide increased nursing staff.

Labour Forces.

47. The voluntary migration of natives across our boundaries in search of work continued during the year as also did the engagement of labour by the Witwatersrand Native Labour Association for work on the gold mines in South Africa. The numbers going out on contract to Southern Rhodesia were again small.

48. A number of local Africans has been voluntarily recruited for service with the King's African Rifles and other military units. During the 1914-1918 war, Nyasaland natives gained a great reputation as good soldiers and there is no reason to believe that the present generation will not maintain that tradition.

Rejections for Unfitness.

49. Natives recruited for service in the Rand Mines by the Witwatersrand Native Labour Association are strictly examined by a European doctor in the service of that Association prior to recruitment. Recruits for the Army were examined and passed by Government medical officers. The poor physique of our young adult population is shown by the number of persons rejected as unfit for recruitment by the Witwatersrand Native Labour Association and for enlistment in the Army :—

W. N. L. A. ...	33.1%
Army	33% in the early stages, and when medical examinations were tightened up, 40%.

50. The Nyasaland Labour Commissioner estimates that at the close of 1939 there were 115,765 Nyasaland male natives working in adjacent territories as compared with 114,776 in 1938. The following data are from figures kindly provided by him.

Working in S. Rhodesia	... ...	71,117
,, ,, S. Africa	... ...	33,214
,, ,, N. Rhodesia	... ...	3,390
,, ,, Tanganyika	... ...	5,967
,, ,, Belgian Congo	... ...	598
,, ,, P. E. Africa	... ...	1,479
	TOTAL	115,765

During the year

720 went out under contracts to Southern Rhodesia.
6,882 ,, ,, ,, ,, ,, South Africa.
400 contracted labourers returned from S. Rhodesia.
3,847 ,, ,, ,, ,, South Africa.

(B). GENERAL DISEASES.

51. Tabulated returns of diseases recorded at Government hospitals and dispensaries during the year are given on pages 35 to 44 and the incidence of cases in certain disease groups is shown in diagramatic form on pages 15 and 16.

52. It is necessary once again in submitting these figures to point out that no reliability can be placed on their accuracy and especially so in the case of figures based on returns submitted from rural dispensaries, for the Africans we have to employ in charge of such units have but an elementary knowledge and can only be expected to record conditions treated in terms of main symptoms.

Deficiency Diseases.

53. The number of individuals coming to our attention with text-book signs of deficiency diseases is again small but the activities of the Nutrition Survey and the contact that has taken place between officers of the Survey and members of this Department has resulted in the observation of a number of conditions which are believed to be due to defective nutrition.

54. There is little doubt that many of these conditions recorded are due to faulty nutrition and that in a large number of cases several factors combine to cause them. The diet of our local African is frequently lacking in more than one essential item. In view of the fact that in the main the conditions observed by our medical officers were first brought to their notice by Dr. Platt, their observations have been communicated to him for inclusion as considered desirable in his report, which it is not doubted will contain a very comprehensive chapter on the local incidence of pathological conditions believed to be caused by defective diets.

Diseases caused by Helminths.

55. Infestation by helminths remains one of our major problems but it is becoming more apparent that such infestations affect the health of the individual more seriously when associated with food deficiency.

Hookworm.

56. While infestation with hookworm is probably the commonest of worm infestations it is common medical opinion that it causes less ill-health than schistosomiasis, which is also a common parasite. Hospital admissions due to hookworm infestation are commonest in the low-lying parts of the Protectorate, namely, the districts bordering on Lake Nyasa and the River Shire. In Mlanje district a highland area, using concentrative methods for observing ova in faeces, the District Medical Officer found 77 per cent. of the population affected with ankylostomes but stated that examination of the faeces of persons for four days after treatment with a vermifuge failed to recover more than thirty worms in any one patient.

Schistosomiasis.

57. Throughout the greater part of the country *S. haemotobium* is a commoner infection than *S. mansoni*, but in limited areas the latter is reported to be very frequently found. Dr. Retief of the Mkhoma station of the Dutch Reformed Church Mission in a report submitted during the year declared that *S. mansoni* is actually commoner in the area from which his patients come.

Ascariasis and Tapeworm.

58. Ascariasis is reported to be a common infestation in the Mlanje district. Elsewhere it is reported, and as might be expected, commonly in children. Infections with tapeworm occur, but are still rare. This is not surprising for the population is still mainly vegetarian.

Guinea-worm.

59. The Medical Officer in charge of the Zomba African Hospital reported a case of Guinea-worm infestation. The source of infection could not be traced. Only once before has a case been recorded within recent years; that case came from the Cholo district and was found in 1936.

Other Helminths.

60. Cases of onchocerciasis continue to occur but the condition is not frequently diagnosed. *W. bancrofi* has a patchy distribution and is reported as causing pathological conditions in the districts to the extreme north and south of the Protectorate.

(C). COMMUNICABLE DISEASES.

Smallpox.

61. Forty-four cases of smallpox were notified during the year, of which thirty-five were reported as occurring in an epidemic in the South Nyasa District, where the infection was believed to have spread over our border from the adjacent part of Portuguese East Africa: all but one of the remaining cases also occurred in this district, but it could not be proved that the infection had spread from the epidemic already referred to. The only case reported from other parts of the country, was discovered in the Lilongwe district, where the body of a man who had died in an advanced stage of the disease was found lying some few yards away from the main road to the north. Although enquiries were instituted, no information could be obtained as to where this man had come from. His body was not identified.

Cerebro-spinal Meningitis.

62. This disease is now endemic throughout the greater part of the Protectorate and in the Southern Province caused certain alarms during the year. In the Chikwawa district, 81 cases were recorded with 27 deaths, and this district was the most seriously affected. From time to time a certain number of cases occurred on various estates and caused some dislocation of labour forces. In the Northern Province, the cases reported were few and occurred sporadically. Two cases were reported in the crew of the lake steamer, "Guendolen," while on her way south from Tanganyika; but fortunately, so far as we know, no cases occurred among the passengers. This last was surprising because, owing to the limited accommodation available, there is always overcrowding on this ship. Cases of cerebro-spinal meningitis admitted to hospitals are to-day treated with the new May and Baker preparation, "693," and the number of fatal cases has been considerably reduced. Unfortunately a large number of cases do not come under medical care until the disease is far advanced, and the persons affected nearly moribund.

Tuberculosis.

63. Cases of tuberculosis are again recorded from almost every district, but we have little accurate information of the true incidence of the infection. Most medical officers record it as their opinion that the infection is spreading slowly but steadily. Many of the persons affected with the disease who seek hospital assistance are in a fairly advanced stage and for such persons very little can be done. The Medical Officer, Fort Johnston, however, has recorded that four patients with signs of fibrosis of the lungs came under his care. Surgical tuberculosis is not rare, and a few cases were admitted during the year to the Zomba African Hospital, which is steadily gaining a reputation for the treatment of surgical conditions. Little is known as to the incidence of tuberculosis in cattle; but while milk is not consumed by the native population to any extent, the meat of cattle that die naturally is frequently consumed and might easily prove to be a source of infection.

Influenza and Pneumonia.

64. Many epidemics of influenza were reported, but so far as we could learn, the disease was of a mild type and without serious complications.

65. Cases of pneumonia brought into hospital are now being treated with M. and B. 693, and the number of deaths due to these causes has fallen considerably. Unfortunately, only a small section of the population take advantage of the hospital accommodation supplied throughout the country.

Typhoid Fever and Dysentery.

66. The number of cases of typhoid fever reported during the year is small but amoebic dysentery remains a major cause still of hospitalization especially amongst Europeans.

Leprosy.

67. Little improvement can be recorded in the number of persons affected with leprosy or in the measures adopted for the control of the disease. During the year, Dr. Muir, Secretary of the British Empire Relief Association, visited the country and made recommendations for the future control of leprosy. As has been stated before, the recommendations are receiving the consideration of Government, but up to the present, it has not been found possible to give effect to them. The following table shows the cases of leprosy under treatment at the various leper institutions, and the contributions made by Government to these institutions.

Station	Daily average in hospital	Admission	Discharges	Deaths	Contributions Paid 1939.		
					£	s.	d.
Bandawe	61.3	3	—	4	106	5	0
Likoma	7.7	—	—	1	27	0	0
Likwenu	52.4	36	22	3	97	0	0
Livingstonia	5.5	—	1	2	12	10	0
Loudon	14.6	—	2	—	37	0	0
Malamulo	236.1	104	73	14	342	0	0
Mua	79.0	38	15	2	112	0	0
Mwami	24.8	3	15	—	59	5	0
Utale	119.5	58	7	7	207	0	0
		242	135	33	£1,000	0	0

Venereal Diseases.

68. Venereal diseases continue to be a serious problem and it is generally believed that both syphilis and gonorrhoea are spreading amongst the population of the rural areas, being conveyed there by natives returning to village life after residence in towns, mines and other centres of work both within and without our boundaries. The finances of the country do not as yet permit of the treatment of gonorrhoea with the new drugs available and reported to be of proved value in other parts of the world. The successful treatment of these diseases also continues to be complicated by the fact that Africans affected will not attend for regular treatment after actual signs of the disease have disappeared.

69. Five men and three women are reported to have received treatment for poradenitis inguinale at the Lilongwe Hospital. The Medical Officer in charge of the African Hospital at Zomba also reports the appearance of cases simulating this condition, and states that he was not able to make a definite diagnosis in the absence of the specific antigen.

Insect-Borne Diseases.

70. The position with regard to the occurrence of insect-borne diseases in this country remains much the same as recorded in 1938.

Trypanosomiasis.

71. The Senior Medical Officer, Kota Kota, who has had long experience of conditions in the Kota Kota district, has suggested that there continues to be a risk that the disease might assume epidemic form between the Bua and D'wanga Rivers. In this area the villages are situated in the midst of tsetse, and people are actually bitten inside their houses. The establishment of villages in this fly area is due in part to the rising of the Lake during recent years, causing the Lake-shore population to fall back into the fly area in the search of land for development. A portion of this population actually, in the last few years, came from the hill areas, being attracted to the Lake-shore area by the high prices obtained for rice grown in the swampy areas left by the falling Lake. If the Lake continues to fall it may well be that the population now living in contact with the fly will return to the Lake-shore away from tsetse infested areas, thus solving our present problem.

72. The tsetse-infested areas in the Kota Kota district were specially investigated during the year, the survey being made jointly by the Medical Officer in charge of the district, and the Entomologist. During the course of their survey, although every man, woman and child living in the area were carefully examined, no person was found with trypanosomes in their blood. The Entomologist's findings are included in his report which is attached.

73. Two cases of trypanosomiasis were reported from the Kasungu district during the last four months of the year. This district, although known to be badly infested with tsetse fly had not produced any cases of trypanosomiasis in recent years. Kasungu adjoins the Kota Kota district, and it is possible that the human infections are due to infected persons from the latter district passing through Kasungu *en route* to Northern Rhodesia. The human infections on the other hand may have been transmitted by fly from animals infested.

Plague.

74. The country having remained free from plague since 1918 when according to available records a small outbreak occurred in the extreme north, it was with some surprise, not unmixed with consternation, that the diagnosis of plague was confirmed in July this year in the case of a child resident in a village in the sub-district of Neno or Central Shire in the Southern Province. Investigations made following the diagnosis proved that two other human cases had occurred in the village previously and that rats had been noticed to be dying in the village before the occurrence of human cases. A dead rat found in the village during the investigations proved to have died of plague.

75. The Health Inspector, Blantyre, was placed in charge of de-ratting measures in the area and the Government Entomologist took charge of investigations amongst the rodents. The affected village was evacuated and carefully de-ratted, all huts being de-roofed during the search of rats and rat-holes dug out. Work being completed here, similar action was taken in all villages within two miles of the one affected. This part of the country is thinly populated and villages were about a mile from each other. The Entomologist in his investigations discovered that there was evidence of deaths having occurred amongst the wild rodents in rat burrows around the village for some months before. Details of his findings are included in his annual report.

76. The area affected with plague being almost adjacent to our boundary with Portuguese East Africa, full details of our findings were communicated to the Medical Authorities of that Territory and also of Southern Rhodesia, suggesting that they should have investigations made amongst their field rodents to see whether any recent mortality had occurred amongst them. Both countries undertook investigations as suggested but failed to find signs of a recent epizootic amongst their rodents.

77. Working in co-operation with Administrative Officers and through them with Native Authorities, a wide-spread examination of field rodents was made throughout the Southern Province and those districts of the Northern Province which border on the South. By these examinations evidence was obtained that up to the present the field rodent infection had only occurred in the district of Neno and the adjoining district of Chikwawa.

78. Up to the end of the year no further human cases have occurred and although Native Authorities have been strongly impressed with the need for reporting immediately the discovery of any unusual rat mortality occurring in their areas, no such reports have been received. It is too much to hope, in a country so well populated as Nyasaland, that further human cases of plague will not occur for another twenty years.

(D). VITAL STATISTICS.

(I). GENERAL AFRICAN POPULATION.

79. The registration of births and deaths amongst the general African population is not yet attempted but since 1933 the Medical Department has tried to keep records of the population in the Fort Manning district. The figures are obtained by rural Sanitary Inspectors with the co-operation of Native Authorities. In 1938 the keeping of statistics was started also in a part of the Lower Shire district. The complete accuracy of the figures obtained by our methods is not claimed.

80. FORT MANNING DISTRICT.

Total estimated population 34,106

Live Births, 1939.

	Male	Female	Total	
One child	792	815	1,607	
Twins	43	59	102	
TOTAL	835	874	1,709	
Still Births	79	63	142	
Live Birth rate per 1,000 of the population				50.1
Still ,, ,, ,, ,, ,, Live Births				83.1

	Male	Female	Total	
Deaths	330	427	757	
Death rate per 1,000				22.2

Causes of Death in Age Groups.

Disease	0—2 years			2—10 years			10 years and above			
	M.	F.	Total	M.	F.	Total	M.	F.	Total	Grand Total
Malaria	50	53	103	44	36	80	30	41	71	254
Pneumonia	13	10	23	9	17	26	33	68	101	150
Diarrhoea	19	17	36	26	19	45	26	27	53	134
Puerperal	—	—	—	—	—	—	—	39	39	39
Other Causes	21	25	46	20	18	38	39	57	96	180
TOTAL	103	105	208	99	90	189	128	232	360	757

81. It will be noticed that 39 maternal deaths due to puerperal conditions were recorded. The term puerperal is used by our enumerators to cover deaths following child-birth. The maternal mortality rate works out at 23.52 per 1,000 live-births. Counting all still-births as single births the maternal mortality was 21.1 per 1,000 births. The maternal mortality rate in Great Britain in 1938 was 2.97. The other terms used in the classification of deaths may be defined as follows: *Malaria*; all deaths associated with fever. *Pneumonia*; all deaths associated with marked chest symptoms. *Diarrhoea*; all deaths due to intestinal disturbances with diarrhoea as the main symptom.

Comparison of Data with those of Previous Years.

	1935	1936	1937	1938	1939
Birth-rate	52.9	46.8	49.4	41.4	50.1
Still-born rate per 1,000 live births	96.0	87.0	63.3	103.3	83.1
Death-rate	21.2	21.8	22.8	26.7	22.2

82. SECTION OF NATIVE AUTHORITY TENGANI, PORT HERALD DISTRICT.

Total estimated population, 19,100.

In 1939 the live-birth rate was 55 per 1,000 of the population compared with 48 per 1,000 in 1938.

Still-births were not recorded.

The total death-rate was 33.4 per 1,000 while in 1938 it was 26.7 per 1,000.

Causes of Death in Age Groups.

	0—2 years			2—10 years			10 years and above			
	M.	F.	Total	M.	F.	Total	M.	F.	Total	Grand Total
Malaria	104	99	203	20	17	37	12	7	19	259
Pneumonia	11	2	13	19	16	35	42	39	81	129
Diarrhoea	17	10	27	19	24	43	22	20	42	112
Other Causes	19	9	28	30	20	50	33	27	60	138
TOTAL	151	120	271	88	77	165	109	93	202	638

(II). ASIATICS.

83. It is estimated that the Asiatic population decreased from 1,748 in 1938 to 1,656 in 1939.

During the year there were 87 births and 17 deaths.

Birth-rate per 1,000 Asiatics	51.9
Death-rate per 1,000 ,,	10.2

Recorded causes of deaths were as follows:—

	Males		Females	
	Adults	Infants	Adults	Infants
Blackwater fever	2	1	—	—
Broncho-pneumonia	—	1	—	—
Cerebral malaria	—	—	—	1
Diphtheria	—	1	—	—
Fever	—	1	—	—
Infantile diarrhoea	—	1	—	—
Influenza and broncho-pneumonia	—	—	1	—
Pulmonary tuberculosis	2	—	—	—
Prematurity	—	1	—	—
Septicaemia	1	—	—	—
Sub-dural haemorrhage	1	—	—	—
Tuberculosis	1	—	—	—
Chronic nephritis	1	—	—	—
Natural causes	—	—	—	1
TOTAL	8	6	1	2

(III). EUROPEANS.

84. The European population is estimated to be 1,953 an increase of 106 as compared with last year.

During the year 48 births and 11 deaths were recorded.

Birth rate per 1,000 Europeans	24.5
Death ,, ,, 1,000 ,,	5.6

Recorded cases of death were as follows:—

	Males		Females	
	Adults	Infants	Adults	Infants
Appendicular abscess	1	—	—	—
Acute appendicitis ,, peritonitis	1	—	—	—
Asthma cardiac failure	1	—	—	—
Carcinoma of uterus	—	—	1	—
Coronary thrombosis	1	—	—	—
Diphtheria	—	—	1	—
Gunshot wound	—	—	1	—
Pneumonia	—	1	—	—
Chronic nephritis	1	—	—	—
Heart failure	2	—	—	—
TOTAL	7	1	3	—

(IV). EUROPEAN OFFICIALS.

85. The following tables show the sick, invaliding and death-rates of European officials during the year with rates for previous years for comparison:—

	1936	1937	1938	1939
Total number of officials resident	269	279	290	289
Average number resident	205.7	225.2	214.9	222.9
Total number on sick-list	93	107	94	105
Total number of days on sick-list	2,018	1,168	1,091	1,143
Average daily number on sick-list	5.51	3.20	2.98	3.13
Percentage of sick to average number resident	2.18	1.42	1.34	1.40
Average number of days on sick-list	21.7	10.9	11.6	10.9
Average sick time to each resident (days)	9.79	5.18	5.12	5.12
Total number invalided	4	5	1	5
Percentage of invaliding to total residents	1.86	1.78	0.3	1.73
Total deaths	1	1	1	2
Percentage of deaths to total residents	0.4	0.39	0.3	0.69

Causes of Invaliding in 1939.

Meningococcal meningitis	1
Psycho neurosis	1
Cirrhosis of liver	1
Chronic appendicitis and cholecystitis	1
Pulmonary tuberculosis	1

Causes of Deaths in 1939.

Paralytic ileus following appendicular abscess	1
Sarcoma of lungs	1

(V). NATIVE OFFICIALS AND NATIVE TROOPS.

86. The native officials numbered 3,306 as compared with 2,989 in 1938. The term "native official" includes police and native troops, but excludes casual labour in receipt of less than ten shillings a month. The numbers of common prevailing disabilities and off-duty days are compared with those of previous years:—

	1937		1938		1939	
	No. of cases	No. of days off duty	No. of cases	No. of days off duty	No. of cases	No. of days off duty
Malaria	169	930	183	1,096	235	1,165
Influenza	51	204	107	690	94	363
Injuries	73	713	83	810	103	1,046
Respiratory affections	52	343	93	1,010	132	1,272
Dysentery	73	527	45	459	49	466
Venereal Diseases	49	1,119	92	2,256	149	3,692

The causes of death were:—

Pneumonia	4
Amoebic dysentery	1
Aneurysm	1
Cancer of larynx	1
Acute pancreatitis	1
Cholangeitis	1
Chronic nephritis	1
Endocarditis	1
Myelitis (syphilitic)	1
Alcoholism	1
Inguinal hernia	1
Epidemic cerebro-spinal meningitis	1

87. The following table shows the sick, invaliding and death-rates of native officials:—

	1936	1937	1938	1939
Total number of native officials	2,603	2,752	2,989	3,306
Total number on sick-list	1,129	906	1,687	1,269
Total number of days on sick-list	11,880	8,135	11,199	12,853
Average daily number on sick list	32.54	22.54	30.68	35.21
Percentage of sick to total number of officials	1.25	0.81	1.01	1.06
Average sick time to each patient (days)	10.52	8.97	6.63	10.13
Total number of deaths	9	12	13	15
Percentage of deaths	0.34	0.44	0.43	0.45

(VI). INCIDENCE OF DISEASES ACCORDING TO GROUPS.

		Hospitals	Dispensaries.
1.	Infectious and parasitic diseases	28,133	35,300
2.	Cancer and other tumours	225	114
3.	Rheumatism, diseases of nutrition and of endocrine glands and other general diseases	963	2,999
4.	Diseases of blood and blood-forming organs	88	512
5.	Chronic poisoning	5	—
6.	Diseases of nervous system and sense organs	10,742	36,522
7.	Diseases of circulatory system	234	107
8.	Diseases of respiratory system	23,553	76,973
9.	Diseases of digestive system	18,503	68,310
10.	Non-venereal diseases of genito-urinary system	544	333
11.	Diseases of pregnancy, childbirth and the puerperal state	401	8
12.	Diseases of skin, and cellular tissues and of bones and organs of locomotion	28,560	92,838
13.	Congenital malformations and diseases of early infancy	26	—
14.	Senility	13	—
15.	Affections produced by external causes	20,628	67,909
16.	Ill-defined diseases	3,692	13,297
	TOTAL	136,310	395,222

DIAGRAM I.

Showing proportion of infectious, systemic and other diseases treated at Government Hospitals (excluding Rural Dispensaries).

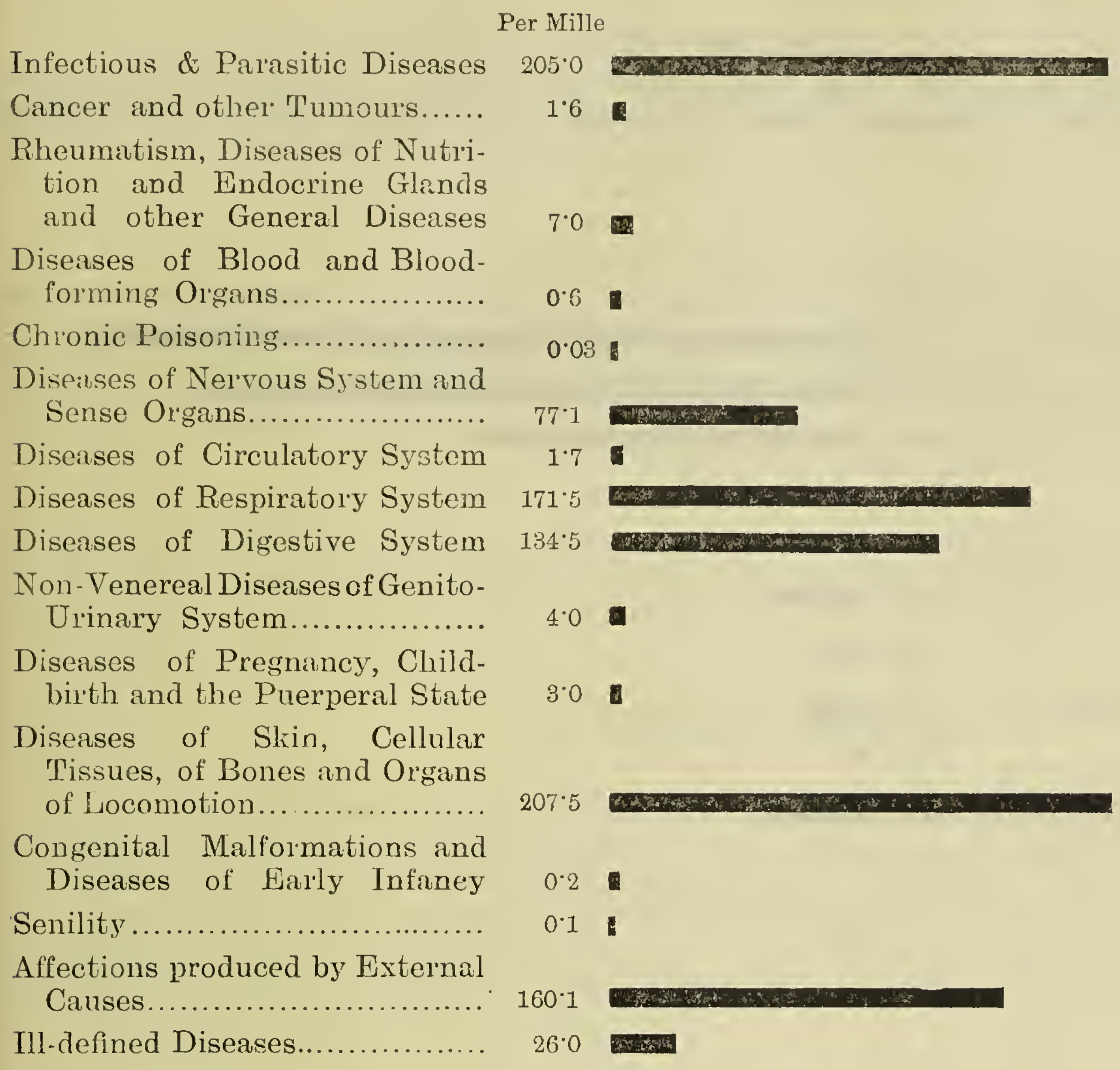


DIAGRAM II.

Showing proportion of in-patient deaths amongst the groups of diseases. Total in-patient deaths, 294 (2.17% of all in-patients).

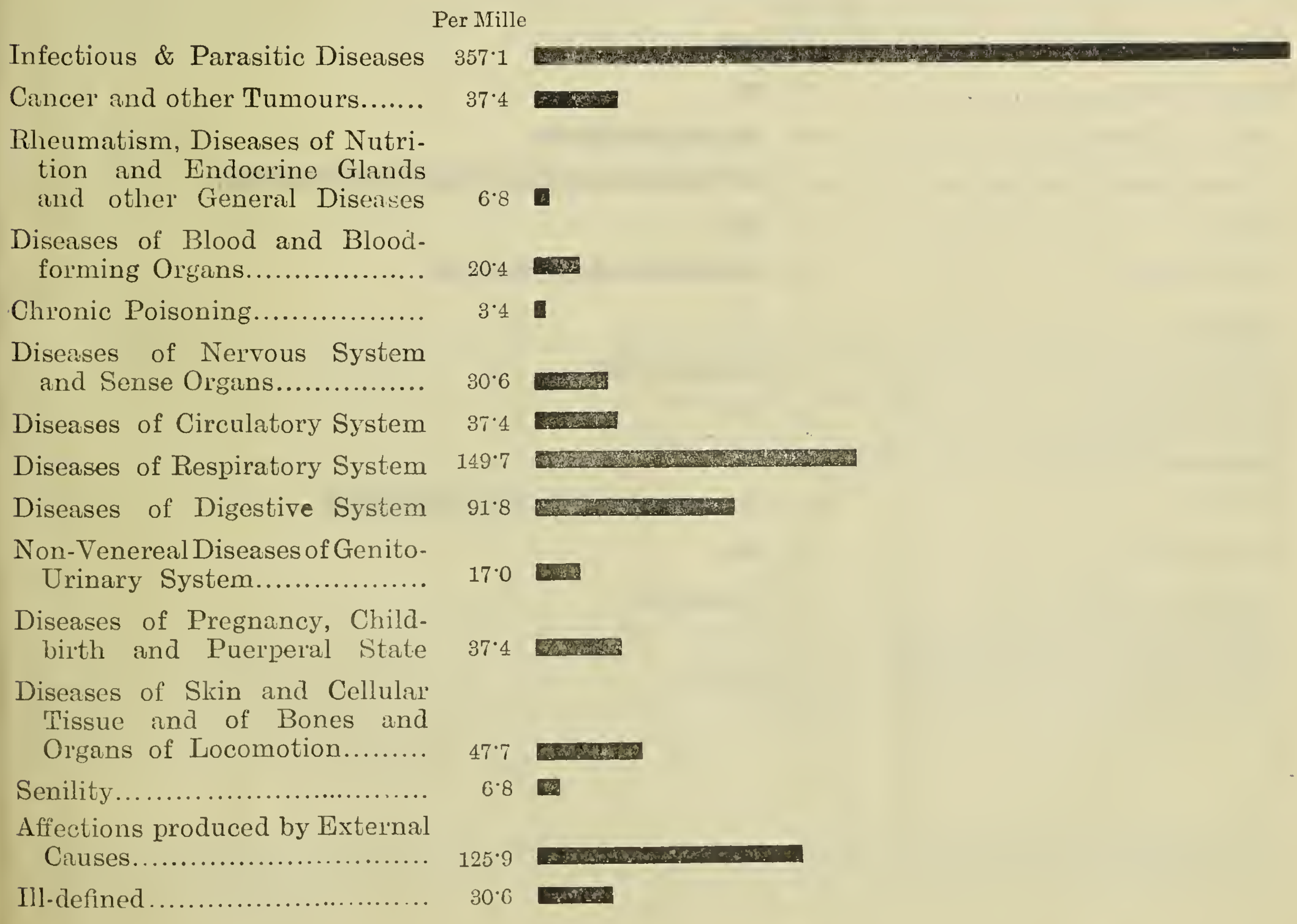


DIAGRAM III.

Showing proportion of the diseases in Group I treated at Government Hospitals (excluding Rural Dispensaries).

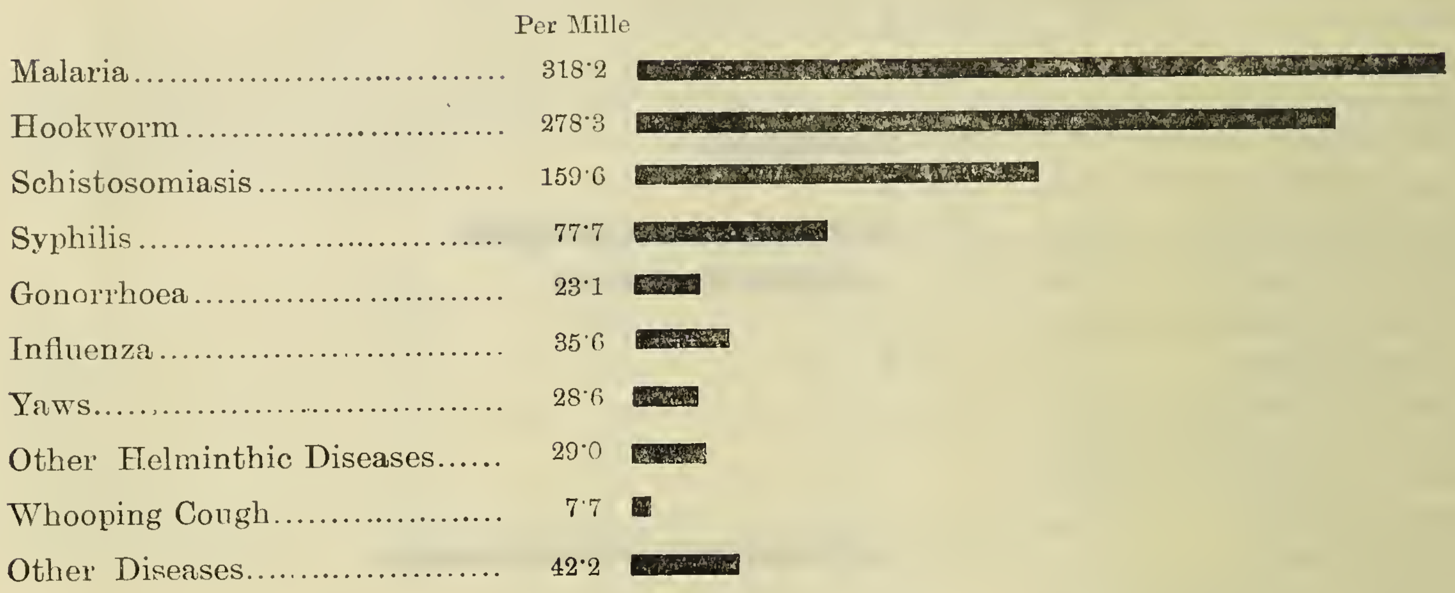
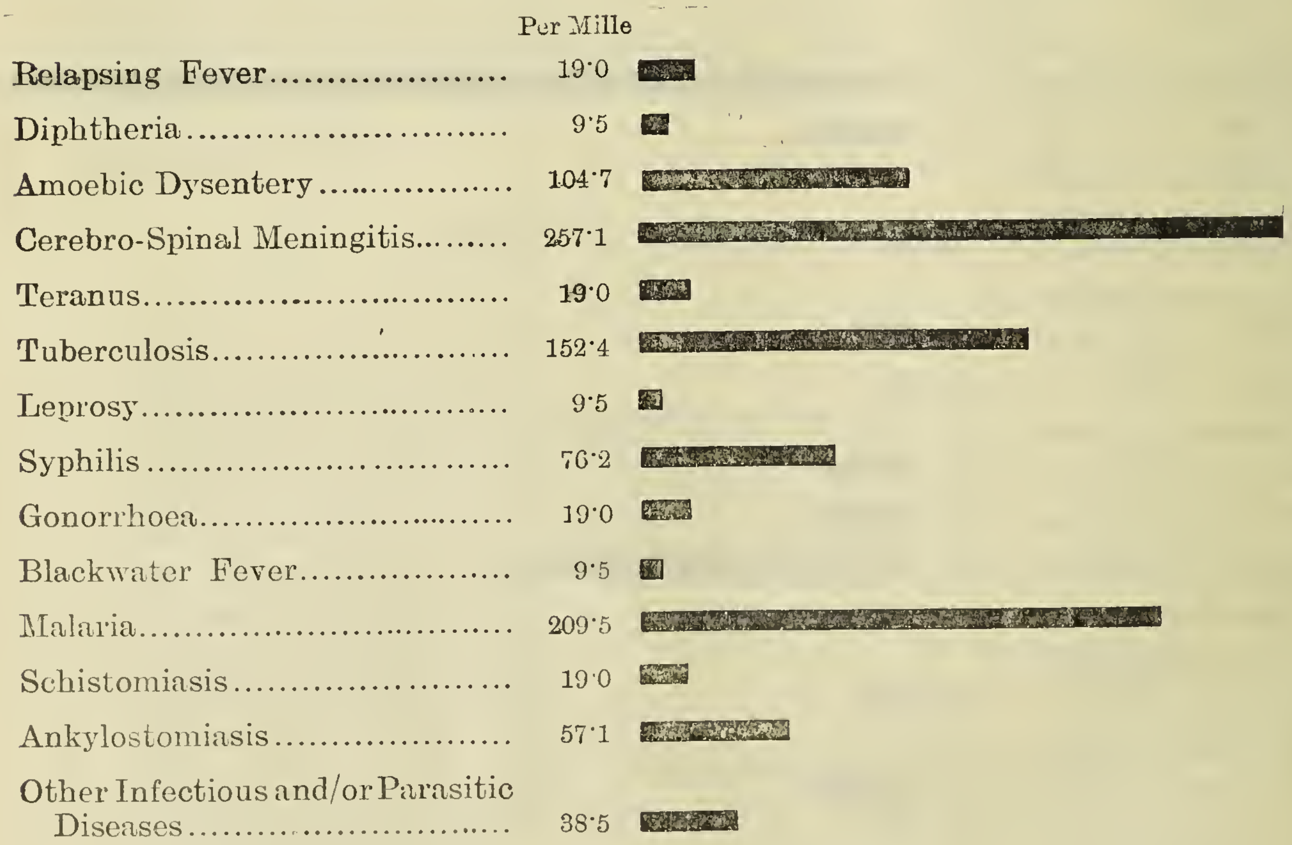


DIAGRAM IV.

Showing proportion of deaths from diseases in Group I occurring at Government African Hospitals. Total in-patient deaths due to epidemic, endemic and infectious diseases, 105.



SECTION III. HYGIENE AND SANITATION.

A. GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

90. There is not a single medical officer in the country engaged wholly on the preventive side of medicine, but during the year under review almost every medical officer took an interest in the public health development of his district, and inaugurated policies for the improvement of the living conditions of the people under his care.

91. In the absence of comparatively well-trained African subordinate staff, medical officers still find it difficult to leave patients, requiring skilled medical attention in hospitals, and go out into rural areas for any lengthy period of time and, further, funds available to the Department to cover travelling still continue to be meagre. Until medical officers can spend at least half of every month touring rural areas, making and keeping contact with Native Authorities, it will be difficult for them to become vital factors in the healthy development of our population.

92. The two European Government Health Inspectors available served throughout the year in charge of routine sanitary services in townships, one in Zomba and the other at Blantyre and Limbe.

I. PREVENTIVE MEASURES.

Malaria.

93. We have no definite information on the incidence of malaria in this country but it would be difficult to over-estimate the importance of the infection as a cause of ill-health, inefficiency and death; for the disease is endemic throughout the Protectorate. No permanent works of any magnitude for the elimination of mosquito breeding places have been carried out during the year in any part of the Protectorate but in many townships efforts were made to drain swamps by earth drains, to fill in pits holding water, to maintain existing drains and oil water that could not otherwise be brought under control.

94. The Medical Officer, Fort Johnston, reported that he had reduced mosquitoes in his township by opening up land-locked pools along the banks of the River Shire, thereby giving small river fish access to such pools. The small river fish consumed the mosquito larvae in these pools.

95. A bat-tower was erected during the year in Fort Johnston and it is believed was instrumental in reducing the number of bats in houses. It is also suggested that bats helped in the destruction of adult mosquitoes. The erection of a further bat-tower is proposed.

Trypanosomiasis.

96. The Medical Entomologist's report covers all the work done this year. The report is appended.

Relapsing Fever.

97. Reports have been received that in the Kasungu district whole villages have recently been evacuated owing to heavy infestations with *O. moubata.* So long as native houses continue to be built of daub and wattle and have earth floors the problem of tick infestation will be difficult of solution but it is believed that much can be done by educating the population to the application of fresh mud to floors at least weekly. All African staff of the Medical Department now preach this gospel on every possible occasion.

Smallpox.

98. If figures of vaccinations carried out can be relied on, our whole population must have been vaccinated and re-vaccinated several times during the course of the last few years. There is evidence, however, that a large section of our population is still unvaccinated and native vaccinators complain that on their arrival in villages a number of the women and children depart into the "bush" to avoid being inspected or vaccinated.

99. A special endeavour is being made to arrange for routine vaccinations through Native Authorities but not all Native Authorities can be depended upon as yet to give the Department wholehearted assistance.

100. Details of vaccinations reported as performed in the various districts are as follows :—

VACCINATION REPORT FOR THE YEAR ENDING 31ST DECEMBER, 1939.

Station	Successful	Modified	Unsuccessful	Not seen	Total
Blantyre and Neno	1,819	—	765	—	2,584
Chikwawa	6,490	—	1,406	—	7,896
Chinteche	1,123	233	2,023	432	3,811
Chiradzulu	2,882	513	871	300	4,566
Cholo	5,459	2,590	862	93	9,004
Dedza	5,130	1,760	717	4	7,611
Dowa	2,193	57	966	296	3,512
Fort Johnston	8,323	1,705	1,094	2,182	13,304
Fort Manning	4,121	2,191	1,179	—	7,491
Karonga	4,998	700	724	—	6,422
Kasungu	5,215	474	687	158	6,534
Kota Kota	6,342	4,325	1,922	433	13,022
Lilongwe	4,500	804	1,189	40	6,533
Liwonde	4,080	—	1,597	—	5,677
Mlanje	4,823	4,375	1,419	14,618	25,235
Mzimba	4,974	832	1,724	360	7,890
Ncheu	9,961	2,036	1,723	472	14,192
Port Herald	4,667	1,167	409	—	6,243
Zomba (Dispensaries)	2,313	1,087	173	1,070	4,643
Zomba (Health Inspector)				1,535	1,535
W. N. L. A. (Recruits)				7,180	7,180
	89,413	24,849	21,450	29,173	164,885

Plague.

101. A full account of the measures taken to deal with this disease on its re-appearance in the Protectorate has already been given.

102. Many of our tribes are accustomed to hunt, kill and eat field rodents and it is hoped that by the issue of constant reminders, information will reach the Department of any unusual mortality observed in rat burrows. All officers on tour have been asked to emphasise on every possible occasion the need for rat destruction and to stress the fact that the rat is an enemy to man.

Helminthic Diseases.

103. Medical Officers and Administrative Officers have for many years endeavoured to educate the rural African population to provide latrines in villages. A number of Native Authorities issued orders for the compulsory provision of latrines in their villages and took steps to see that their orders were obeyed. These campaigns resulted in the digging of communal pit latrines but evidence available indicates that when constructed the latrines are not always put into regular use.

104. During the last year the policy with regard to latrines in native villages has been pressed and to-day all African village populations are advised to provide family pit latrines sited as close as reasonably possible to the family hut.

105. Where it has been possible to provide family latrines it is found that they are constantly used. Already in some districts a number of villages are well provided with family latrines and there is reason to believe that the latrine habit is likely to be adopted more generally throughout the country.

106. Medical Officers in charge of districts are following up latrine campaigns by arrangements for the systematic treatment of village populations with vermifuges and there is evidence that such treatment is appreciated and sought after. It is at present departmental practice to refuse wholesale treatment to a village, until a report is received from its headman that all huts are provided with latrines and the report checked by a member of the Department. A number of village populations in the districts of Port Herald, Fort Johnston and Karonga has already been treated.

107. The provision of latrines in villages will, however, not altogether eliminate hookworm infections for during the rains, which coincides with the planting period, many natives spend a considerable number of hours each day working in their fields which are frequently more than a mile away from their huts. The provision of latrines around the fields in addition to those near living huts, therefore, becomes a necessary part of our campaign.

108. Even before our campaign for individual latrines was started it was evident that the local native appreciated latrines and used them, for the better educated members of a village population provided these on their own, adjacent to their huts, and used them regularly.

109. It is pleasing to be able to record that a few estate-owners, managers and others who employ resident labourers, have during the year evinced an interest in the prevention of the spread of hookworm and other worm diseases and have tried to provide individual pit latrines for families or for small groups of employees resident on their land in lieu of the large communal pits they were accustomed to provide in conformity with local legislation. Communal pits were not generally conveniently sited and were seldom maintained in a sanitary condition.

110. Some employers have imported machines for the making of bore-hole latrines, and are putting them into use. Bore-hole latrines are not found, however, to be the universal success they are reported to be in other parts of the world, possibly due to the fact that our soil conditions are not altogether similar.

Schistosomiasis.

111. For the large part, Nyasaland is a country of lake, rivers and swamps and the native population is densest where water is most plentiful and easily accessible. Although no systematic survey has ever been made of the snails of this country, there is ample evidence that lake-shores, banks of slow-flowing rivers and swamps all harbour snails that can transmit bilharzia.

112. It has already been pointed out that infection with *Schistosoma haemotobium* and *Schistosoma mansoni* is common and that many medical officers working in the country believe that these infections eventually cause much ill-health.

113. While it is possible that our latrine campaign in villages may help in reducing infections with *S. mansoni*, it will, it is feared, make little reduction in the number of infections with *S. haemotobium* for our Africans like all primitive people are accustomed to emptying their bladders whenever the urge to do so occurs merely seeking, if in company, the privacy of the nearest bush. Under such conditions the infection of intermediate hosts living in swamps, etc. continues to be likely.

114. Attempts have been made in many parts of the country to demarcate along the banks of the Lake and River Shire suitable and reasonably safe sites for drawing drinking water and bathing, but what has been done only affects a very small section of the population and to make safe watering places for the bulk of the population is a problem that can only be tackled effectively when the majority are educated to understand how the disease is transmitted. Until such time as the population is educated efforts must be directed to the provision of wells properly protected and placed more conveniently than the water supplies provided by nature.

115. In the Fort Manning district many shallow wells have been provided by the local village population and in the Fort Johnston and Karonga districts some ramps have been built projecting into the Lake so that water supplies can be obtained without contact with the dangerous shore. Even where such ramps have been built it is found difficult to control bathing for the women especially, are accustomed to make their ablutions amongst the reeds, which prevent their being overlooked.

II. GENERAL MEASURES OF SANITATION.

Sewage and Night Soil Rubbish Disposal.

116. Only in Zomba has any serious attempt been made to provide water-borne sanitation with septic tank disposal but even here a large part still awaits attention. In other townships the population is served either by bucket services or pit latrines; a few private householders have provided septic tank installations for themselves. Where piped water supplies are available Government is installing septic tank systems in all new houses erected.

117. No existing township has a complete bucket service for it is the practice to serve African populations with pit latrines.

118. In district stations some improvement has been made in the provision of latrines for Africans, for Government is taking steps to ensure that on every residential plot at least one latrine is available for African domestic staffs. It is rapidly becoming unusual to find Government African subordinate staff unprovided with sanitary conveniences.

119. Most of the larger townships have a communal pit for rubbish disposal, rubbish being dumped usually in old pits within townships which in the past held water in the rainy season and were potential breeding places for mosquitoes.

Water Supplies.

120. During the year some small improvement was made in the Zomba water supply, areas not previously satisfactorily served being provided with an improved supply. Schemes, however, for the treatment of the water prior to delivery have been delayed.

121. The Blantyre Town Council, at the end of the last dry season, found it necessary to publish notices in the press advising the population, served by the public water supply, to boil their water prior to consumption for with the dropping of the water in the reservoir there was evidence that it was considerably polluted and even that fish were dying in numbers. The increased consumption of water at this period also caused the filters to be over-worked and prevented their being cleaned at regular intervals. Mr. Stewart, a consulting engineer, was invited up from Salisbury and has made certain recommendations for the prevention of a repetition of conditions caused this year.

122. The Lilongwe water supply which comes from the Lilongwe river has never given satisfaction for not only is the supply liable to considerable pollution but during the rainy months is so discoloured as to be unsuitable for ordinary domestic purposes. The question of a new source of supply received consideration during the year and it is proposed to obtain the water supply for this town from bore-holes, which are to be put down by the Public Works Department in consultation with the Geologist. A bore-hole sunk in the vicinity of the township some years ago has continued to give good and ample supplies.

123. In rural areas, a few bore-holes, deep and shallow wells have been provided during the year, but the country as a whole is still poorly served with protected water supplies.

European Housing.

124. Type plans for the housing of Government European officials have been reviewed during the year and new type plans have been prepared. Future erections will be an improvement on existing housing provided. Government funds, however, do not yet permit of the installation of long baths or stoves of the Dover pattern even in new houses.

African Housing.

125. New type plans for Government African housing have also been prepared and future houses erected will be better lighted and ventilated and provide increased accommodation; all new houses will have kitchens and essential sanitary conveniences. Government in appreciating that the existing African housing for its staff is not satisfactory proposes to provide funds in next year's estimates to make a start with new erections and hopes in the future to provide increased sums for this necessary purpose.

126. On estates a number of employers of labour have begun to improve the accommodation provided for their African employees but in no case has the housing provided been sufficient for all such employees. In rural areas there continues to be evidence that the African is steadily improving accommodation of his own accord. This is most marked in the area of the Atonga in Chinteche District.

III. SCHOOL HYGIENE.

127. The Advisory Council on Education on which all Mission authorities engaged in education are represented, at its annual meeting approved the issue of regulations under the Education Ordinance for the better sanitary control of schools. These regulations which are included as an appendix have already been gazetted and endeavours will be made during the next few years to see that they are complied with. It is hoped by improving schools and school surroundings to educate the younger generation to a desire for living under better conditions than those existing to-day.

128. Although systematic medical inspection of schools and scholars cannot as yet be undertaken by the Department a number of schools were inspected and scholars examined and, where possible, arrangements were made for the regular treatment of those found to be in need of medical attention.

129. At all medical inspections of African schools a very high percentage of scholars were found to have active signs, though not amounting to disease, of defective nutrition. In certain cases recommendations for the improvement of diets were issued and at least in one case it is possible to record that the Mission authorities have endeavoured to put the recommendations into effect.

130. The Health Inspector from Zomba and the Medical Officer gave courses of lectures and demonstrations at the Jeanes School to teachers and chiefs in training there. There is evidence that some of the chiefs trained at the Jeanes School endeavour to practise what they have been taught and have met with some measure of success.

IV. LABOUR CONDITIONS.

131. The issue of a booklet on the housing and feeding of manual labourers by the Medical Department has already been recorded.

132. Government has not yet found it possible to enforce, by legislation, the recommendations made but His Excellency the Governor in his preface to the booklet wrote as follows:—

> "I commend Dr. de Boer's Memorandum to the attention of all employers of labour in the Nyasaland Protectorate. In every territory of Africa, Government and employers are giving closer attention to the most important question of the diet and housing of African labour and I am most anxious that Nyasaland should not lag behind in its attack on this problem. I seek the co-operation of every person who is concerned with the employment of African labourers and I feel sure that we shall be able to effect great changes for the better without having to invoke the provisions of penal legislation. I am aware of a willingness in the planting community to make every possible effort to improve the conditions under which African labour works in the Protectorate and I propose to take early advantage of this spirit."

133. Our young adult natives continue to leave the country in search of work, and better wages than are paid locally. The number emigrating is large and all officials, missionaries and others in contact with village life reiterate the fact that villages are left depleted of men and that the economic and social life of rural areas is being adversely affected.

134. The number of local natives working during the year outside our boundaries is estimated to be 115,765 as compared with 114,766 in 1938. Of this number 71,117 were in Southern Rhodesia and 33,214 in South Africa. The number working in South Africa has increased while the number in Southern Rhodesia has dropped.

135. The high rates of wages offered for employment on the gold mines in South Africa as compared to the wages ordinarily paid in Southern Rhodesia has undoubtedly proved a greater attraction. There is little doubt also that the extremely good food given to labourers on the Rand Mines is an added inducement. Africans returning from work in South Africa come back invariably fitter and healthier men than when they left their homes.

136. Recruitment for work on the gold mines is in the hands of the Witwatersrand Native Labour Association who maintain a very large staff of Europeans in the country among whom is a Medical Officer who takes full responsibility for the medical examination of those recruited.

137. It is not possible yet to state that the conditions under which labourers from this country are housed and fed in other adjacent territories are satisfactory.

V. FOOD IN RELATION TO HEALTH AND DISEASE.

138. As has already been stated the work of the Nutrition Survey has given a considerable impetus to the interest taken locally in the subject of nutrition which interest has been further strengthened by the publication of the Report of the Economic Advisory Council's Committee on Nutrition entitled, "Nutrition in the Colonial Empire."

Copies of the Committee's report have been issued to Administrative Officers, Medical Officers, Agricultural Officers, Unofficial members of Legislative Council and the local Press and have helped in educating all sections of the population in the importance of the subject.

139. A practical demonstration of the benefit that accrues from improved feeding was afforded within a short period of the outbreak of war when African soldiers were placed on an improved and balanced diet. The improvement in the physical and mental condition of the recruits, within a month of being placed on the new ration scale, was so marked that even the military authorities expressed their surprise at the change and enthusiastically demonstrated it to all visitors to the training depot.

140. The Government of this Protectorate is fully appreciative of the fact that the conditions of employment in Government service should be a model to all private employers and is now considering steps for the improvement of conditions of the Government African employees. The local Government does not intend to leave itself open in its campaign to improve African welfare to the retort, "Practise what you preach."

(B). MEASURES TAKEN TO SPREAD KNOWLEDGE OF HYGIENE AND SANITATION.

141. During the year health exhibits on a scale not previously attempted were staged at the Blantyre and Lilongwe Agricultural Shows and demonstrators especially trained for the purpose were employed throughout the exhibitions in explaining to all visitors the lessons to be learned from the exhibits. The public health sections proved popular with all classes of the population. At the Lilongwe Show model houses in *pisé de terre* were on view and demonstrations were given of how simply this work could be done by ordinary untrained labourers.

142. In December, a Baby Show was held at the Zomba African Hospital and prizes distributed to mothers who had brought their children regularly to the local child-welfare clinic. In connection with the Baby Show, public health exhibits were also staged and demonstrations given by trained African members of the staff. The Show was attended not only by large numbers of women and children but by chiefs and headmen from the surrounding areas. During the Show visitors were conducted round the hospital and allowed to talk to patients. It is believed that all visiting natives were impressed by the accommodation and treatment now available at this hospital.

143. Dressers in charge of dispensaries have been required during the year to visit, at least twice weekly, villages within a radius of five miles of their dispensaries. On arrival at the village they are expected to collect as many of the village population as possible and give them a lecture or talk on subjects of public health importance. The value of these talks is, naturally, dependent on the ability of the dresser to "put it across" and results achieved have, therefore, varied considerably.

(C). THE TRAINING OF PERSONNEL FOR EMPLOYMENT BY THE DEPARTMENT.

144. The African Hospital, Zomba, is still the only Government institution where any systematic training of dressers has been attempted and even here it cannot yet be claimed that the training given is altogether satisfactory although improvements have been made.

145. During 1939, two medical officers and two sisters were maintained at the hospital and even though considerable demands from out-station districts were made for additional staff, dressers in training were not withdrawn from their classes until their courses had been completed.

146. Further improvements in the training courses are proposed for 1940 and arrangements have already been made for admitting 18 male and 18 female probationers to the school. Male probationers have been picked by means of competitive examinations conducted by the Director of Education, held simultaneously all over the country. Admission of this large number of new students has been made possible by the erection of a training school and hostel out of money provided by the Colonial Development Fund. The building is not yet complete, but it is hoped, will be ready for occupation early in the new year.

147. The teaching staff at the training school has been strengthened by the allocation of certain duties to the Government Pathologist and the Health Inspector, Zomba.

148. Students entering the course will be given, in the first instance, two years regular training which will fit them for employment as dressers. The best of the students trained will, on completion of their course as dressers, be given a further two years' training to fit them for employment as hospital assistants and will be permitted to sit for the local examination conducted by the Nyasaland General Medical Council.

149. Training of students to the Hospital Assistant grade is also undertaken by the Blantyre Church of Scotland Mission Hospital, but even here the medical staff finds it difficult to give sufficient attention to the training of students, for their duties include the care of a large African general hospital and also one for Asiatics.

150. Training of midwives is undertaken now at the Zomba African Hospital, the Church of Scotland Mission Hospital, Blantyre, and the Dutch Reformed Church Mission Hospital at Mlanda in the Ncheu district.

151. During the year seven midwives passed the examination held by the local Medical Council. The existing Midwives' Ordinance is to be amended and the syllabus for the training is to be extended. The amended Ordinance will receive the consideration of the Legislative Council when it meets next year. The training schools are already working on the new and improved syllabus.

152. It has not been found possible to arrange for systematic courses for training African sanitary inspectors for the only available health inspectors are fully engaged in routine sanitary services and cannot give students all the attention necessary. Local Africans owing to their lack of elementary education cannot be trained efficiently unless teachers are available to give them detailed attention. Courses of lectures are not sufficient.

153. The two Assistant Mistresses at the Jeanes Training Centre have continued during the year to educate the wives of teachers and chiefs attending the various courses held at the school, in the care of children and the ante-natal care of infants. The training given is, however, very elementary and does not attempt to make these women competent to undertake midwifery in villages.

(D). RECOMMENDATIONS FOR FUTURE WORK.

154. Our most urgent need is a competent African staff paid sufficiently to make it content to remain in the service of the Department. A competent subordinate staff will not be available until Government undertakes systematic training of local Africans to meet our needs. Even the training school at Zomba, to which reference has been made, will not provide staff sufficient to replace employees who have to be retired on reaching the age limit or for reasons of health. To train African staff, competent and sufficient teaching personnel must be made available.

155. Detailed recommendations for the provision of a medical school and grouped hospital unit in Blantyre with the necessary staff of teachers have been submitted to Government. The future of the Medical Department is very dependent on these recommendations being given effect to. The new training school will not replace but will be in addition to the one now being developed at Zomba. The new school will undertake training for the highest grades while the existing institution will concentrate on training dressers and nurses.

156. The standard of competency to which the local African can be trained is dependent on the general education he has received prior to admission to such specialised courses. When general education is improved the standard of training given by the Department will be raised. To-day the standard of general education in the country is very low, but steps are being taken by Government, through the Education Department, to open during the new year two schools under Mission direction, as an advance towards a higher standard of education.

157. Next to the training school the most urgent need is a staff of European nursing sisters for duty at our African hospitals and for developing ante-natal, infant welfare and maternity services.

158. Health Inspectors are required for work in the district and not just in townships, supervising routine sanitary services. European health inspectors working in rural areas could help much in improving housing, providing safe water supplies, in measures directed to improve nutrition and in other spheres of activity.

159. Medical Officers are required for many district hospitals but it would be unwise to attempt to develop more hospital centres than are existing to-day until those already provided are functioning to full capacity.

160. Funds are required to permit of available medical officers spending a considerable part of their time touring native areas and making contact with the people.

161. Diets provided to in-patients in hospital could be considerably improved. Funds now available do not permit of a well-balanced diet being given. A good diet for patients might shorten the cure and convalescent stages.

SECTION IV. PORT AND HEALTH ADMINISTRATION.

162. The small quarantine camp maintained at Port Herald, the first administrative centre reached by persons entering the Protectorate through the port of Beira, was in use during the year and numbers detained here were as follows :—

	Men	Women	Children
Africans	19	14	21

163. African labourers from Portuguese East Africa in transit by road between the Sena Sugar Estates in the district of Morromeu and Angonia, also in Portuguese East Africa, were examined at Port Herald. The numbers examined were as follows :—

	Men	Women	Children
Africans	3,163	642	736

Two individuals were found to require hospital treatment and admitted to the hospital at Port Herald. One of these suffering from secondary anaemia eventually died.

164. Recommendations have been submitted to Government for improving sanitary conditions in and around the main aerodrome at Chileka to bring it to the standard of a sanitary aerodrome as defined by the International Sanitary Convention on Air Traffic. The recommendations are receiving the consideration of Government.

SECTION V. MATERNITY AND CHILD WELFARE.

165. Missions still do the greater part of the maternity and child-welfare work undertaken in the country, but Government is slowly developing its own services. All present activities must only be considered to be a beginning, preparing the field for future development.

166. The Mission activities centre round Blantyre, Mlanda and Livingstonia. The Church of Scotland Mission at Livingstonia directs the work in their branches at Loudon, Karonga and Ekwendeni.

167. Government activities are limited to the African Hospital, Zomba, the Jeanes School and a small unit maintained at Liwonde where a native midwife is posted.

168. On the posting of a European sister to the new European Hospital opened at Lilongwe, infant-welfare work was started at the local native hospital but failed to develop as the European sister could not give any time to work outside the European hospital.

169. As native midwives trained at the Zomba African Hospital become available for posting to out-stations it is hoped to provide African midwives at all Government hospitals. Midwives trained at Mission stations are not yet available for Government service as they are absorbed by Mission activities.

170. The welfare centre maintained at the Jeanes School continued to do good work but activities here were somewhat hampered by ill-health of the staff and the incidence of long leave.

171. Government subsidises the infant-welfare work of Missions by an annual payment of £350 to the three Missions engaged in this work, namely, the Church of Scotland Missions at Blantyre and Livingstonia and the Dutch Reformed Mission at Mlanda. The subsidies are intended to cover the cost of the European nursing sisters maintained.

The following table gives details of the work at the various centres :—

	Blantyre Mission	Mlanda Mission	Zomba African Hospital	Ekwendeni Mission	Loudon Mission	Jeanes School	Karonga Mission	Livingstonia Mission
I. Visits paid to new births and other conditions associated with pregnancy	210	74	164	—	—	—	776	—
II. Ante-natal and gynaecological examinations at clinics, out-patients (new cases).	233	392	74	10	—	132	—	42
Total out-patient attendances ...	1,434	1,686	—	28	—	735	114	305
III. Infants admitted to I.W.C. at Welfare hospital	284	99	364	104	178	101	—	—
Infants admitted to I.W.C. at district centres	385	211	218	896	—	—	643	—
Total attendances of infants at Welfare hospital	8,956	2,777	2,335	4,060	3,820	—	—	5,057
Total attendances of infants at district centres	4,670	3,881	1,212	2,961	—	—	9,255	13,872
IV. Mothers admitted to Welfare hospital for :—								
(*a*) Ante-natal conditions								
(1) abortions	15	13	7	1	—	5	—	—
(2) premature labour	6	1	7	—	—	—	—	—
(3) other conditions	34	44	—	—	—	—	—	—
(*b*) Confinements								
(1) normal	135	119	98	2	—	48	—	24
(2) abnormal	39	14	14	—	—	5	—	—
(*c*) Post-natal conditions								
(1) retained placenta	7	3	1	—	—	—	—	—
(2) puerperal sepsis	5	7	1	—	—	—	—	—
(3) other conditions	10	4	—	3	—	—	—	—
V. Number of still-births								
(1) at hospital	32	14	10	—	—	—	—	3
(2) in district	34	20	—	—	—	—	—	—
Number of maternal deaths								
(*a*) at hospital	11	5	—	—	—	—	—	—
(*b*) in district	2	—	—	—	—	—	—	—
VI. Total confinements								
(*a*) at hospital	251	133	112	3	—	53	—	—
(*b*) in district	463	185	97	20	—	52	—	—

SECTION VI. HOSPITALS AND DISPENSARIES.

European Hospitals.

172. The existing Government hospitals for Europeans at Blantyre and Zomba were maintained and a new hospital for Europeans at Lilongwe opened on August 19th, 1939.

173. The hospitals at Zomba and Blantyre leave much to be desired and for some years no improvements have been authorised as Government has been considering replacing them by one central hospital built on more modern lines. Various proposals have been considered and it is now generally agreed that it should be part of a new general hospital unit in the Blantyre area.

174. 124 patients were treated in Government European hospitals during the year of whom 77 or 62.9% were admitted to the Blantyre Hospital. Blantyre is the most convenient centre for the greater part of the European population which is concentrated in the towns of Blantyre and Limbe and on tea and tobacco estates in the Shire Highlands.

175. 45 of the persons admitted suffered from dysentery, of which number 44 were stated to be due to infection with *E. histolytica*. 51 of the admissions were due to malaria. Three Europeans died while in hospital.

176. A small hospital for Europeans is maintained by the Seventh Day Adventist Mission at Malamulo. Details of cases treated at this institution are not available.

Asiatic Hospitals.

177. In most Government African hospitals accommodation can be made available for the admission of Asiatics and at the Zomba hospital separate accommodation is provided. A Mission hospital for Asiatics is maintained by the Church of Scotland Mission at Blantyre. A small subsidy is given to this Mission by Government in recognition of the work done.

178. The need for an Asiatic hospital at Lilongwe to cater for a not inconsiderable Asiatic population, scattered over the Northern Province, is becoming daily more evident and the need will have to be met in the near future.

African Hospitals.

179. There was no increase in the number of African hospitals maintained by Government during the year. As has been stated before three of the rural dispensaries have had to be closed down since the outbreak of war. A new dispensary at Salima, the rail-head of the Northern Extension, was in the course of erection but was not completed by the end of the year. This dispensary when opened will replace two existing dispensaries situated within a few miles of the new unit; both dispensaries to be closed consist of temporary daub and wattle erections.

180. The number of cases treated as in-patients and out-patients in the hospitals increased considerably during the year. The numbers being as follows:—

		In-patients		Out-patients
1939	...	12,975	...	136,310
1938	...	10,597	...	124,264

There was also a considerable increase in the number of persons treated at dispensaries, the number rising from 302,318 in 1938 to 395,222 in 1939.

181. Although numbers treated in hospitals have increased, votes provided for the maintenance of hospitals have not increased in proportion and it is becoming increasingly more difficult to provide patients admitted with a satisfactory diet. In a country where the average inhabitant suffers from defective nutrition, good feeding is an important part of curative medicine.

182. Details of populations in districts and hospital attendances at medical units provided in these districts are tabulated as follows:—

	1938			1939			Daily average in Hospital	Area in sq. miles	Rank of officer in charge	Density per square mile, 1931 Census
	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries	Cases treated at Native Hospitals		Cases treated at Rural Dispensaries				
	In-Pts.	Out-Pts.	Out-Pts.	In-Pts.	Out-pts.	Out-pts.				
Blantyre and Neno ...	—	—	37,611	—	—	56,303	—	1,801	M.O.	85.64
Chikwawa	202	3,414	14,853	312	4,077	17,551	14.50	1,897	S.A.S.	18.92
Chiradzulu	522	5,060	14,987	479	4,982	17,918	25.20	270	S.A.S.	296.77
Cholo	757	4,688	6,555	761	5,691	9,906	38.70	624	S.A.S.	94.79
Chinteche	434	8,164	12,355	281	6,082	12,942	21.82	1,925	H.A.	23.06
Dowa	360	2,838	14,743	639	4,294	24,747	27.59	1,802	S.A.S. or H.A.	64.41
Dedza	471	6,548	19,425	526	4,987	23,763	28.77	1,818	M.O.	76.06
Fort Johnston ...	717	10,114	6,420	757	10,804	5,504	63.94	2,518	M.O.	29.79
Fort Manning ...	396	5,669	13,780	440	8,439	19,837	26.44	1,453	S.A.S.	23.47
Karonga	805	9,309	18,697	783	9,041	23,479	47.91	3,004	M.O.	12.79
Kasungu	373	3,538	8,155	357	4,336	7,832	15.47	3,330	S.A.S. or H.A.	10.95
Kota-Kota	933	13,332	22,785	631	13,262	27,161	58.11	2,430	M.O,	47.17
Lilongwe	549	7,029	9,044	695	6,739	9,908	33.74	2,677	M.O.	51.90
Liwonde	257	3,793	15,166	259	6,244	15,925	17.54	2,045	H.A.	16.29
Mlanje	754	6,199	18,608	895	7,740	19,863	42.85	1,531	M.O.	27.89
Mzimba	262	6,029	19,404	274	4,574	20,822	15.09	5,729	S.A.S.	30.73
Ncheu	443	7,791	18,913	520	5,968	21,473	20.43	1,092	H.A.	69.22
Port Herald	696	4,182	19,734	827	4,865	23,686	51.69	749	S.A.S.	108.98
Zomba African Hospital ...	2,671	13,021	35,337	3,267	17,227	25,877	137.70	903	M.O.	—
,, C. Prison Hospital	248	5,497	—	272	6,402	—	18.80	—	M.O.	—
,, Jeanes T. Centre ...	—	—	5,706	—	—	6,007	—	—	A. Mistress	—
,, King's A. Rifles ...	—	—	—	—	—	4,718	—	—	—	—
,, Lunatic Asylum ...	—	—	—	—	556	—	—	—	—	—
Total ...	10,597	124,264	302,318	12,975	136,310	395,222	—	—	—	—

SECTION VII. PRISONS AND ASYLUMS.

Prisons.

183. Prison accommodation remains the same as described in previous reports. In the Central Prison at Zomba the facilities for the bathing and washing of prisoners were improved and walls of cells were white-washed. In the past, cell walls were coated with tar which made the rooms very dismal and gave concealment to vermin. A campaign started by the Medical Department to improve prison diets failed owing to lack of funds.

Central Lunatic Asylum.

184. This institution remained during the year under the administration of the Police and Prison Department. The daily average number of inmates in the asylum during the year was 99.95 as compared with 93.42 in 1938. Eighteen of the inmates are criminals and 32 are detained at the Governor's pleasure. There were only 3 lunatics in detention in prisons at district stations at the close of the year. The health of the inmates was good.

SECTION VIII. SCIENTIFIC.

ANNUAL REPORT OF THE MEDICAL ENTOMOLOGIST FOR 1939.

I was on duty during the whole of the year spending the greater part of it at my base in Fort Johnston. I was engaged for rather over two months, however, in the Kota Kota district on a survey for cases of sleeping sickness and for about a fortnight in the Neno sub-district of Blantyre where I studied an outbreak of bubonic plague with special reference to the rodents involved and their ectoparasites.

I. SURVEY FOR SLEEPING SICKNESS.

2. This was conducted, by the instructions of the Director of Medical Services, jointly with the Medical Officer of the Kota Kota District, Dr. R. N. Wilcox, with the object of determining to what extent the disease was occurring in the district, sporadic cases having been reported from time to time over several years.

3. The programme suggested by the Director was a full examination of every man, woman and child living within five miles of any village or area in which cases had occurred during the last five years. This was duly carried out, I becoming responsible, by arrangement with Dr. Wilcox, for the work in the region south of the Kota Kota-Kasungu road, roughly the southern half of the district, he agreeing to undertake the survey to the north of it. It subsequently became necessary for me, in order to comply fully with these instructions, to extend my survey into the northern part of the maritime plain in the Dowa district, two or three of the cases having occurred near the border.

4. I examined the blood of 2,851 persons in all, by the thick film method, not finding a single infection, and I was confident that I secured for examination practically the whole of the population concerned, for the Native Authorities had been duly advised by the District Commissioner of my impending arrival so that they might have their people in readiness. I made enquiry of all headmen if everyone had come forward and of individuals of both sexes as to the whereabouts of husbands and wives respectively when these were absent and endeavoured in the case of the smaller communities to check up names with the assistance of the headmen by means of a census list with which Dr. Wilcox had thoughtfully provided me. I furthermore pressed headmen in all the villages to inform me of any persons who might be lying sick in their huts.

5. Despite my failure to find any cases, however, one came to light shortly after my departure. The patient was an old woman who admitted that she had not come forward with the rest of the people when I was in the village though she had had ample opportunity of doing so since I was encamped there for five days.

6. The discovery of such a case naturally raised the question as to what extent other cases may have remained undiscovered. Concealment was the main difficulty experienced in coping with the epidemic in the vicinity of Domira Bay from 1911 onwards and suspicion of myself, an entire stranger, may well have been responsible in the present instance. But I was entirely confident of the validity of my conclusions as concerns the films that *were* examined, none of the persons with whom I dealt manifesting any physical signs of the disease such as would have led me to carry out repeated blood examinations, nor indeed complaining of being sick.

7. From my study of the topographical distribution of *Glossina* in relation to population it became my conviction that any major outbreak of sleeping sickness would be extremely unlikely for as a result of the poverty of the soil over most of the area the population is concentrated along the coast where conditions suitable for the cultivation of the staple foods of the region, cassava and rice, exist and in the broad, open stretches bordering the rivers in the south where the cultivation of maize and other cereals as well as that of cotton are carried out on a large scale. These are not the normal habitats of the fly, but as concerns the population actually living within the fly area, in which there are but few patches of land of agricultural value, the position was very different for there exist the factors that might well lead to a minor epidemic. The villages are all small ones, their clearings being ineffective against the fly; indeed, in some instances the shade conditions necessary for it are existent within some of them (I took fly again and again in one village in the course of a stay of four days). The gardens are at a distance from the villages, while the chances of infection are still further increased by the abundance of game animals from which it would here seem the tsetse have been deriving the infective strain of trypanosome. I should imagine too, that the powers of resistance of these people to infection may well have been lowered by their lack of a balanced diet for, unlike those living in the vicinity of the Lake who subsist very largely on fish, they get little nitrogenous food.

My recommendations were:—

(*a*) that concealment of cases might be counteracted by making it the duty of vaccinators to take blood films of all sick persons encountered for examination by the medical officer.

(*b*) that dispensers also might be instructed to submit to the medical officer films taken from all persons showing a temperature.

(*c*) that all small villages in the fly areas should be eliminated and should be settled together to form larger communities the activities of which in the way of clearings, etc., would have some real effect in dispelling the fly.

(*d*) that the removal of villages from one site to another should not be permitted without authorization of the District Commissioner who should first satisfy himself that the site selected was outside the fly zone.

(*e*) that indirect attack on the fly might be carried out through measures directed against the game. The operation of the Game Laws, 1911, being suspended over the southern part of the district (a game reserve existing in the north of it).

As an additional need for the control of game it seemed to me that in that particular region game rather than man must be serving as the reservoir of the infecting organisms for the occurrence of cases in villages that are not within the fly area, all of which were isolated ones, seemed to preclude the possibility of there having been man to man infections. But the incidence of such cases over a long period of time and over a wide area is readily explicable if one assumes that *T. rhodesiense* has here become a parasite of wild animals, in which as Corson has recently shown, it may retain its infectivity to man for several years and perhaps indefinitely.

(*f*) I suggested, further, that the question of rectifying the southern boundary of the game reserve might well be considered for it is traversed by the main road leading from Kota Kota to the west whereby it has become highly probable that flies are conveyed into the settlement by cars or on the backs of natives. The boundary should have been, in my view, to the north of this road.

II. INVESTIGATIONS IN CONNECTION WITH AN OUTBREAK OF PLAGUE.

8. I carried out an investigation into the prevalence of bubonic plague in the domestic and field rodents in the neighbourhood of Nderesina, a village near the Lisungwe dispensary in the Neno sub-district of Blantyre where three human cases had been discovered. The occurrence of the first had been suspected by the African Dresser in charge of the dispensary who then called in the Medical Officer by whom a provisional clinical diagnosis of plague was made. This was confirmed by the Director on his examination of smears and the *post mortem* examination of a domestic rat, one of a number found dead in the thatch of the hut in which one of the cases had occurred. It had become urgently necessary, therefore, to find out the extent of the infection in the domestic rat population there, whether it had spread to these animals in villages nearby and whether field rodents were involved.

9. The investigation as concerns the domestic rats was readily carried out, for de-thatching of the huts and grain stores were already in progress under the direction of the Health Inspector, Mr. W. A. Willox, and so I was able to secure and examine all the rodents taken. From the thatch of the first 3 huts examined 35, all *Rattus rattus alexandrinus*, were secured including 7 dead ones (5 recently) and thereafter from the 39 huts comprising the village 175 living ones and 45 dead, while 14 living ones and 6 dead ones were obtained from 20 grain stores. But search in these stores also brought other rodents to light, 23 multimammate mice, *Mastomys coucha*, including one long since dead and one short-tailed field mouse, *Saccostomus campestris*.

10. I then turned my attention to the field rodents in the village, employing a gang of Africans to search for any dead rodents that might be lying about and to open up burrows. This resulted in the discovery of the dried remains of a *Saccostomus* and of a recently dead and partly-consumed shrew, *Crocidura hirta, Pet.* Fourteen more multimammates (the principal intermediary in the spread of plague between domestic and field rodents in South Africa) were unearthed with the remains of 6 others long since dead, one "Nangwali" (as yet unidentified), 3 other small rodents, "Chingowe" and nine shrews.

11. I then extended my search to the immediate vicinity of the village to a width of about 500 yards round it, as a result of which a recently dead *Mastomys* was discovered on the surface while 17 living ones with nine *Saccostomus* and 6 gerbilles *Tatera nyassae shirensis*, were unearthed. The *Mastomys* was sent to the Medical Laboratory in Zomba for examination and proved to be plague-infected.

12. De-thatching of all huts and a thorough search in the fourteen villages within a radius of five miles of the infected area was then carried out. In only one of these villages were dead rodents found, 3 *Rattus* in the thatch of one hut, 7 in that of another all long since dead, while from the 21 grain stores in it were obtained 15 *Rattus* with 23 *Mastomys* including one long since dead. The total number of *Rattus* obtained in these villages comprising 352 huts was 860, including 55 dead ones.

13. The numbers present in each thatch varied very considerably, there being many in some, few or none in others. The greatest number taken from any one thatch was 55, the hut concerned being rather isolated while, curiously enough, only one was taken from another thatch about 400 yards distant. The age of the thatch may have some bearing on this perhaps, and in this particular region where there is a dearth of the long grass suitable for thatching it may have to last for many years, old thatches harbouring more rats presumably.

14. Definite evidence having been obtained that the field rodents in the neighbourhood of the infected village were involved I then endeavoured by digging out burrows and catching rodents far and wide to trace the channel by which the infection could have reached the village. The search resulted in the occasional discovery of a dead *Mastomys* or *Tatera*, invariably dried and mummified, very few indeed by comparison with the apparently healthy animals taken, and it became evident that without the co-operation of the natives themselves, and over a very wide area, it would be almost impossible to trace the extent and possible source of the enzootic, a mild one that had evidently existed over some time. The Director concurred with this view and accordingly made arrangements with the Administration to secure the co-operation of the Native Authorities and through them of the headmen and villagers themselves in the matter.

15. I made large collections of the ectoparasites of the rodents particularly of *Rattus* and *Mastomys*, which were submitted through the Director to the Imperial Bureau of Entomology for determination. They proved to be :—

SIPHONAPTERA (Fleas)

Pulicidae

Xenopsylla Brasiliensis Baker, ex *Rattus rattus alexandrinus, Mastomys couchae, Saccostomus campestris, Taterona nyassae shirensis,* rodent "Lipuku", rodent "Kapete".

Xenopsylla Syngenis, Jord—ex *Saccostomus campestris, Taterona nyassae shirensis.*

Echidnophaga Gallinaceus, West—ex *Mastomys coucha, Rattus rattus alexandrinus.*

ACARINA (Mites)

Gamasidae.

Laelaps Muricola, Tragardh—ex *Mastomys coucha, Taterona nyassae shirensis, Rattus rattus alexandrinus,* rodent "Lipuku", rodent "Kapete".

Laelaps Muricola, Trag. ex *Saccostomus campestris.*
,, *Giganteus,* Berl. ,, ,, ,,
,, ,, ,, rodent "Nangwali".

IXODIDEA (Ticks)

Haemaphysalis sp, Calcarata Neum (Nymph and larvae ex *Mastomys coucha).*

III. COCKROACHES IN RELATION TO MYCOBACTERIUM LEPRAE.

16. In continuation of my search for a possible insect vector of *M. leprae* I commenced a study of domestic cockroaches in relation to it for, if insects play any part at all, it would seem obvious that they must be common species such as come into very close relation with man; and cockroaches do so in backward countries to an extent that is hardly realized perhaps in those in which sanitary organization has reached a high level. In this country for instance, particularly at the lower elevations, every hole and cranny, particularly in the neighbourhood of latrines and stores for food, may harbour the insects in the absence of systematic endeavour to keep them under control when foodstuffs, particularly those of a fatty nature, become tainted by their droppings or by the fluid exuded by them on occasion, the characteristic flavour being one to which Africans and some European residents of long standing appear to become readily habituated and entirely indifferent.

17. The ubiquity of the cockroach, domestic species of which are to be found from the Pole to the Equator, its voracity and preference for food of animal origin, often of the foulest nature, would seem to render it more likely to be a vector than any other insect except, possibly, the haematophagous fly. It is moreover certain that given an opportunity, and opportunities are certainly not lacking in this and other countries with a large native population living in a primitive state, it will devour leprous material and it may even on occasion feed on the leper direct. (It may be recalled in this connection that in Brazil cockroaches have been said to browse down the eyebrows and eyelashes of sleeping children and even to gnaw their toe-nails). It is believed too that the house cockroaches of to-day have been associated with man from time immemorial, their lineage being an exceedingly ancient one and through the agency of commerce they have certainly followed him wherever navigation has extended and so may well have been responsible for the spread of the disease within the last century or two to lands where it was previously unknown.

18. The present investigation was concerned with *Periplaneta orientalis,* Linn., the familiar "black-beetle" of Europe, and *Nauphoeta cinerea,* Oliv. both species exceedingly abundant in this country.

19. There might be two methods, both contaminative, by which the cockroach could disseminate the causal organisms apart, possibly from carrying them on its feet. It might discharge them, subsequent to a leprous meal, in its faeces for it invariably fouls food when feeding or it might infect food through its contaminated mouthparts, the assumption then being that, as postulated by von Behring and Calmette for *M. tuberculosis,* infection of the human subject might take place through the alimentary canal. The main study was given to the former of these possibilities, the method being to allow the insects, bred ones for the most part, to feed on dressings of plain lint that had been applied to leprous sores, all from the same subject, with a mixed infection, and then to examine the droppings day by day.

20. It may here suffice perhaps to give some account of a few of the experiments, amounting in all to 39, that were undertaken.

Thirty-four newly-born *Nauphoeta* (the species is viviparous) were afforded during three days an opportunity of feeding on such a dressing removed twelve days previously from the sore on which it had been left for three days. Their faeces passed on the third day were found to contain globi in abundance, greater indeed than in the original material as is the case with the haematophagous flies, the increase being due, presumably, to the withdrawal of other matter by the processes of digestion and absorption. Globi continued to be numerous up to the sixth day from the termination of the infecting feeds, dissections showing the presence of the organisms in the alimentary canal from end to end but chiefly in the crop and rectum. They could still be detected in faecal smears up to the 9th day. On the 10th day many irregular amorphous masses of acid-fast material appeared among which it would have been difficult to detect the organisms, but on the 11th day the presence of exceedingly minute acid-fast particles with some short filamentous acid-fast bacilli was recorded. By the 15th day large masses of these organisms had appeared while on the 20th day they were found in extreme abundance in a smear of fluid expressed from the rectum of one of the insects. The faeces passed on the day following were negative but the organisms reappeared, and in great profusion, again on the 22nd day and were found thereafter each day until the 32nd day. Faecal smears from material passed over the next 6 days were negative and then on the 42nd day from the last feed on the leprous material the organisms were again detected. For two days following this the faeces were again negative and then several small groups were detected. For seven more days they were not seen in the smears prepared daily and then again on the 55th day further large masses were found over a period of three days. The faeces remained negative for a further period of six days at the end of which on the 66th day a few small groups were found. Thereafter the faeces that were examined at intervals of about three days up to the 85th day from the termination of the meal on the leprous material remained negative.

21. In addition to the short filamentous acid-fast organisms and amorphous masses of acid-fast material, to which reference has been made, other bodies were seen from time to time, short, thick bacilli staining more deeply than the filamentous organisms and occurring scantily amid masses of coarse, irregular granules, rounded bodies, about the size of a red blood corpuscle, apparently homogeneous in structure and occurring singly, rather similar bodies occurring singly and in twos, threes, fours, fives and apparently encapsuled, and rather barrel-shaped structures of approximately the same size. The insects had been fed subsequent to their leprous meals on common articles of human food, *e.g.*, bread, hardboiled egg, porridge, fruit, etc., often left till it was in a mildewed and rather decomposed condition.

22. Parallel results were obtained in other experiments. Thus ten similar roaches were fed for five days on a leprous dressing six days old, globi being found in their faeces, passed on conclusion of their meal. These disappeared but were replaced on the eighth day by nebulae of exceedingly fine acid-fast granules. A faecal smear prepared on the ninth day proved to be negative but many large groups of the short filamentous bacilli previously referred to appeared in smears from faecal material passed and examined daily from the twelfth to the twentieth day. On the latter day the organisms proved to be so numerous that several fields were completely filled by them. From the twenty-first to the twenty-fourth day the smears were negative but the organisms reappeared on the twenty-fifth day, persisted till the twenty-ninth and then vanished. They reappeared scantily on the thirty-third day but were not again detected in smears made at intervals of a few days up to the sixtieth day.

23. In another experiment 38 *Periplaneta*, thirty-eight days old, were fed for nine days on a crust removed six months previously from the ear of the leprous patient, a smear still showing abundant globi and minute acid-fast particles. The faeces, passed immediately after the insects were removed, contained large clusters of the short filamentous bacilli which were so numerous in smears prepared from material passed on the day following that they occupied half of several fields examined consecutively. They persisted for two days and then disappeared but were again found on the sixth and thirteenth days though not in between and in much smaller numbers.

24. Again, ten *P. orientalis* were allowed to feed during three days on a leprous dressing just removed from a sore on which it had been placed two days previously. Leprous organisms were not detected with certainty in a smear prepared from faeces passed a few hours subsequent to their removal from it, though the impression was gained that considerable numbers of faintly-stained rods in rounded masses were present. *M. leprae* was definitely found, however, on the third day while on the fifth day nebulae of minute acid-fast particles were present. These were seen again on the eighth and twelfth days, the short slender bacilli being detected for the first time on the thirteenth day. On the fourteenth day large masses of the minute acid-fast particles were seen and thereafter groups of the short filamentous bacilli. The acid-fast particles were again seen on the twenty-first day and were succeeded by these bacilli, which persisted, in material passed during the three days following. Thereafter the faeces remained negative as to these bodies.

25. With a view to making control observations to this work, bred cockroaches were fed on exactly similar material, omitting of course the leprous meals at the start, their faeces being collected and examined in the same way.

26. In one experiment in which twenty *P. orientalis* were utilized, the faeces examined daily over a period of thirty days remained entirely free from acid-fast bacilli and granules though many of the rounded acid-fast bodies appeared; in another in which thirty of these roaches were employed the faeces, examined daily for ten days, remained negative except for irregular masses of acid-fast material and these rounded bodies. In a third experiment in which twenty-six similar roaches were employed, recently hatched in captivity, the faeces remained devoid of any bodies bearing the slightest resemblance to bacilli for nine days, when irregular masses of acid-fast material with finer particles varying greatly in size and some elongated bacilli-form bodies appeared and two days later some short broad acid-fast bacilli with finer ones among them in a few small groups. These were not found in smears examined during the twenty-one subsequent days. Again no fewer than eighty *P. orientalis*, nine days old, were allowed to feed for four days on a dressing of plain lint that had absorbed discharge from an ordinary tropical ulcer, smears of their faeces remaining free of acid-fast bacilli and particles during the twenty-three days in which examinations were made. Still further, the faeces of a series of bred *Nauphoeta* examined over a period of ten days during which the only food supplied was decomposing meat, mutton, remained free of acid-fast bacilli resembling those found after a leprous meal, though short broad acid-fast rods with a few more slender forms intermingled with masses of amorphous material appeared in greater profusion than in any other experiments of a like nature, but very scantily indeed by comparison with the filamentous forms that invariably appeared in the faeces of the leprous fed insects.

27. It may well be therefore, that such forms are mere saprophytes, in which connection it may be observed that organisms presenting similar features are commonly present in the alimentary tract and faeces of haematophagous flies. The short filamentous bacilli may equally well of course be saprophytes though, as it seems to me, certain points favour a supposition as to their leprous nature. These are :—

(*a*) Their invariable appearance in the faeces at a fairly definite period after the infecting meal.

(*b*) Their numbers, contrasting with the marked scarcity of the other forms that are more certainly saprophytes.

(*c*) Their persistence in the faeces of the insects over long periods, not so much in large numbers after the first week or so, as in small isolated masses.

Were they degenerating lepra bacilli, the expectation would surely be that they would be rapidly eliminated from the alimentary tract and, were they saprophytes, that they would persist and in large numbers indefinitely, the roaches consuming various foods almost daily in a state far from fresh.

(*d*) Their appearance in the faeces in numbers that would almost seem to be in direct proportion to the length of time the roaches had had an opportunity of feeding on the leprous material. When they were left with it for 24 hours only for example, the globi passed were comparatively few, as in due course were these bacilli, but when the feeds were spread over three days globi became numerous, these organisms showing up in vast abundance.

(*e*) The absence of such bacilli in smears from leprous sores and dressing, whether fresh or old, which renders an explanation of their origin difficult except on the assumption that it is a leprous one.

(*f*) The orderly disposition of some of these masses of bacilli in which, as in some leprous globi, the long axis of all the organisms runs in the same direction.

(*g*) The occasional occurrence of masses of them in areas devoid of all other material, or at all events of material taking up the stains utilized as may be the case with *M. leprae* when voided by the cockroach.

(*h*) The occasional occurrence of acid-fast particles, uniform in size, in large numbers before these organisms are in evidence. While it is the case that these were found on few occasions only, it may well be that they are the precursors of these bacilli, developing at a rate so rapid that the optimum time for detecting them had yet to be discovered.

28. There would seem to be two methods by which any satisfactory conclusion as to their real nature could be arrived at, by culture and by attempts to infect experimental animals. I attempted the latter, utilizing white rats in the first place, since the rat is the only animal, I believe, known to develop a form of leprosy, though this is commonly held to be distinct from the human form on what grounds I have not been able to learn. The close contact over a long period with a leprous subject considered as being the main factor responsible for the spread of the disease might certainly be operative in the case of the animals but, on the other hand, there is the well-ascertained fact that rats, particularly those of the genus *Rattus*, habitually prey on roaches so that it cannot be outside the bounds of possibility that they become infected in this way, rat leprosy being due possibly to a modification of the human strain.

29. It may here be recalled that evidence of the cockroach-eating habits of domestic rats was afforded long ago by the observations of Fibiger dealing with the life cycle of the worm *Gongylema neoplasticum*. The eggs are apparently ingested by the roach and the larvae on hatching in its stomach pass through its wall and become encysted in the muscles of the thorax. When such an infected roach is eaten by a rat the larvae are liberated and enter the gastric mucosa where they develop.

30. Attempts to infect white rats consisted in dropping emulsions of faeces from infected roaches at varied intervals into the eyes and noses of the animals, mixing this material with their food, rubbing it into excoriations of their tails and injecting it intraperitoneally though, curiously enough, four out of seven of the animals into the eyes of which this material had been dropped shed their fur over several small patches on the head and neck about a fortnight later. This rapidly grew again, however.

31. Late in the year when more literature on the subject of leprosy in rats had become available I learnt, from the work of Uchida, that attempts to infect white rats and mice with rat leprosy had proved negative and thereupon carried out experiments on similar lines with wild rats, *Rattus*, and two other species, amplifying the work by the injection of material from infected cockroaches into the lymphatic glands. I further endeavoured at the suggestion of the Director to infect Hyrax, three of which, all adults, were captured for the purpose. These unfortunately succumbed from a cause unknown during one of my absences from headquarters.

32. There has been no outcome so far to this work nor can it yet be expected if the incubation period of six months, as given by Uchida for the development of leprosy in rats following direct inoculation from animal to animal, can be taken as affording any guide.

IV. MUSCA SORBENS IN RELATION TO MYCOBACTERIUM TUBERCULOSIS.

33. I obtained proof that *M. tuberculosis* may remain viable within the fly *Musca sorbens*, Wd. up to eight days, for a guinea-pig into which was injected intraperitoneally the gut contents of three of the flies that had fed on tubercular sputum this number of days previously, succumbed four months later to a generalized infection, particularly of liver and spleen. A second animal into the peritoneum of which was injected the gut content of similar flies five days subsequent to the infecting meal also died from the same cause.

V. OBSERVATIONS ON ORNITHODORUS AND RELAPSING FEVER.

34. The endeavour to ascertain the infection index of *Ornithodorus* with the spirilla of relapsing fever, referred to in my report for last year, was continued during the first few weeks of the year under review but finally abandoned, for out of the large number of the creatures that were examined so few were found to contain the organisms as to make it certain that other phases which cannot be detected with certainty in the present state of knowledge were being overlooked.

VI. OBSERVATIONS ON MOSQUITOES.

35. The determinations of the collections of mosquitoes of the *A. funestus* series submitted for determination last year to Mr. H. S. Leeson of the Department of Entomology at the London School of Hygiene and Tropical Medicine may be here recorded with advantage perhaps. All were collected in July in the middle of the dry season and proved to be true *Anoph. funestus*, Giles., falling into wing groups as under:—

	Males	Females	Total
Group 1	5	71	76
2	2	219	221
3	1	9	10
4	0	8	8
	8	307	315

36. Among the captures during the months of August and September, both dry and very hot months, were a number of *Aedes subargenteus*, a fact of practical importance and of interest, since members of the genus are so rarely taken on the wing in the dry season in this country and this particular species appears to be a rare one, not having been obtained outside Nyasaland from which, so far as I am aware, it was first described. Two females oviposited in the laboratory and I bred out a few imagos in due course. A further minor observation, emanating from a search for the larvæ of *A. rhodesiensis* was the presence of the larvae of *A. gambiae* in a pool in the bed of a stream that had almost run dry, the rains having ceased in late March, for this species seems to breed for the most part during the rains and in the early dry season only. These larvæ afforded imagos in due course.

37. I made a further attempt to investigate the possibility of *A. rhodesienses* being a vector of malaria in the highland districts, but without success, for the species which is day-biting is rarely taken within habitations, departing after its meal, though hundreds of imagoes were bred, the majority refused to bite, probably because they had not been fertilized.

W. A. Lamborn,
Medical Entomologist.

ANNUAL REPORT OF THE GOVERNMENT PATHOLOGIST, ZOMBA, FOR THE YEAR 1939.

Staff changes during the year were responsible for a slight dislocation of the laboratory service with a resulting fall in the total number of investigations undertaken. In June, Dr. H. M. Shelley who had been responsible for the institution and development of the Nyasaland laboratory was transferred to Tanganyika Territory. His successor, Dr. D. A. Skan, did not arrive until November, the interim period being bridged by a Medical Officer.

2. The African staff has been increased by one junior Laboratory Assistant. One labourer has, however, enlisted in the King's African Rifles and has not been replaced.

3. *Pathological and Bacteriological Specimens.*

A. BLOOD SPECIMENS.

Total number of blood examinations	3,028
Films for parasites	2,077
Blood cultures	4
Vanden Bergh test	2
Blood urea estimation	1
Blood sugar estimation	3
Sugar tolerance test	1
Complete blood count	12
Arneth count	18
Haemaglobin estimation	15
Sachs Georgi	587
Kahn	105
Ide	179
Widal	24

Of the 2.077 blood films examined, parasites were found as follows:—

Malaria	364
T. duttoni	7
M. bancrofti	5

The results of flocculation tests for syphilis are as follows:—

	Sachs Georgi	Ide	Kahn
Total	587	179	105
Positive	195	44	61

Of the 24 Widal agglutination tests 10 were positive for *B. typhosus.*

B. URINE SPECIMENS.

Total number of examinations	2,016
Urobilin	1
Diazo and Russo's test	3
Glucose estimation	1
Urea estimation	1
Culture	13

Schistosoma haematobium was present in 280 specimens.

C. FAECAEL SPECIMENS.

Total specimens examined	2,081

The undermentioned parasites or their ova were discovered.

Hookworm	822
S. mansoni	60
Ascaris	47
Strongyloides	27
Enterobius	8
Trichuris	6
E. histolytica	60

Flagellates	1
Hymenolepis nana	1

D. Sputa Examination for B. Tuberculosis.

Total specimens examined	161
Positive	18

E. Nasal Smears for Leprosy Bacilli.

Total specimens examined	259
Positive	202

F. Urethral Smears for Gonococci.

Total specimens examined	163
Positive	88

G. Ulcer Scrapings for Treponema pallida.

Total specimens examined	334
Positive	214

H. Miscellaneous examinations.

Throat swabs general and cultural	10
Pus smears	28
Splenic smears for *B. pestis*	6
Bone marrow smears	2
Cerebro-spinal fluid general	11

I. Histological Examination of Tissues.

Carcinomata	9
Rodent ulcer	1
Sarcomata	4
Malignant melanoma	1
Rectal adenoma	1
Vitelline adenoma	2
Fibro myoma	7
Chondroma	1
Appendicitis	5
Filarial tumour	1
Granulation tissue	5
Gumma	3
Tuberculoma	2
Sebacious cyst	1
Endometritis	1
Mucous polyp	1
Normal tissue	3

J. Medical Legal Examinations.

Complete analysis of viscera for poisons	4
Examination of miscellaneous substances for the detection of poisons	11
Examination for the presence of blood	12
Blood groupings in paternity case	1
Examination of clothing for spermatozoa	1

Twelve *post mortem* examinations were conducted at the request of the Coroner the cause of death being as follows:—

Homicidal stab wounds	2
Homicidal fracture of skull	1
Suicide by hangings	2
Natural causes heart failure	2
Cause of death undetermined	5

D. A. Skan,
Pathologist.

RETURNS.

TABLE I. STAFF.

European.

H. S. de Boer, M.C.	Director of Medical Services.
W. A. S. Lamborn, O.B.E.	Medical Entomologist.
D. A. Skan	Pathologist. (Transferred from Tanganyika Territory with effect from 3-11-1939).
H. M. Shelley	Pathologist. (Transferred to Tanganyika Territory with effect from 20-6-1939).
R. Calleja	Senior Medical Officer.
T. A. Austin	Senior Medical Officer (Transferred to Tanganyika Territory with effect from 6-1-1939).
H. G. FitzMaurice	Senior Medical Officer. (Promoted with effect from 6-1-1939).
W. H. Watson	Medical Officer.
W. L. Gopsill	,, ,,
R. Nicklin	,, ,,
F. O. W. A. Mahon-Daly	,, ,,
P. J. Bourke	,, ,,
L. C. Mayne	,, ,,
R. N. Wilcox	,, ,,
D. P. Turner	,, ,, (Seconded to Armed Forces with effect from 4-9-1939).
H. D. Cronyn	Medical Officer.
C. H. Howat	,, ,, (Transferred to Aden with effect from 7-7-1939).
A. T. D. Whitfield	Medical Officer.
W. T. C. Berry	,, ,,
W. A. Glynn	,, ,,
J. O. Creighton	,, ,, (Appointed with effect from 5-5-1939. Seconded to Armed Forces with effect from 28-12-1939).
O. N. Ransford	Medical Officer. (Appointed with effect from 13-1-1939. Seconded to Armed Forces with effect from 30-10-1939).
Miss N. M. Cremen	Matron.
Miss H. M. Phillips	Nursing Sister. (Retired from service with effect from 5-6-1939).
Mrs. N. K. Clemence	Nursing Sister.
Miss M. E. S. Cumming	,, ,,
Miss E. M. R. D. Davies	,, ,,
Miss R. P. Harrison	,, ,,
Miss E. Irving	,, ,, (Resigned with effect from 30-7-1939).
Miss S. Barber	,, ,, (Transferred to Malaya with effect from 20-9-1939).
Miss M. Arnot	,, ,,
Miss P. Hutchinson	,, ,,
Miss K. Scott	,, ,,
Miss M. J. C. MacDonald	,, ,, (Appointed with effect from 2-12-1938).
Miss E. B. L. Calder	,, ,, (Appointed with effect from 5-5-1938).
Miss H. S. Evans	,, ,, (Appointed with effect from 11-8-1939).
Miss E. A. Barker	,, ,, (Appointed with effect from 25-8-1939).
R. W. G. Pegg	Office Superintendent and Medical Storekeeper.
V. T. Smithyman	Clerk. (Transferred to Customs Department with effect from 11-4-1939).

Miss E. Carr	Clerk and Stenographer (Temporary). Appointed with effect from 1-4-1939).
W. A. Willox	Health Inspector.
F. L. Chapman	,, ,,

Asiatic.

B .T. Lele	Civil Sub-Assistant Surgeon.
Lakhapat Singh	,, ,, ,,
S. S. Kokari	,, ,, ,,
G. K. Joshi	,, ,, ,,
Badri Prasad, M.B.E.	,, ,, ,,
G. D. Kashap	Subadar, I.M.D. Sub-Assistant Surgeon.
Bansi Lal	Subadar, I.M.D. Sub-Assistant Surgeon.
Sohan Singh Pannum	Jemadar I.M.D. Sub-Assistant Surgeon. (Reverted to duty with the I.M.D. with effect from 3-6-1939).
Lachhman Das	Jemadar I.M.D. Sub-Assistant Surgeon.

AFRICAN.

*Dan S. Ngurube	Senior Hospital Assistant, 1st Grade. (Promoted with effect from 1-10-1939).
*Leonard Makolera	Hospital Assistant, First Grade.
Moses Kaunde	,, ,, ,, ,,
*Godwin Maulidi	,, ,, ,, ,,
Elliott Taumbe	,, ,, ,, ,,
Dyson David	,, ,, ,, ,, (Seconded to Armed Forces with effect from 29-9-1939).
*Fred Nyirenda	Hospital Assistant, First Grade.
E. G. Hoare	,, ,, ,, ,,
Harry M. Thomson	,, ,, ,, ,,
Radford Botha	,, ,, ,, ,,
J. B. Wachepa	Junior Hospital Assistant.
G. Ndovi	,, ,, ,,
R. C. Undi	,, ,, ,,
Kenan W. Mkandawire	,, ,, ,,
*Alifeyu T. M. Mkisi	,, ,, ,,
Elias D. Sisya	,, ,, ,, (Promoted with effect from 1-11-1939).
Hudson B. Chamba	Clerk, Super Grade.
Isaiah M. Jere	,, First Grade.
E. E. Mothello	,, ,, ,,
P. W. Mlanga	,, ,, ,, (Resigned with effect from 19-10-1939).
J. Grayson Kapondah	,, ,, ,, (Promoted with effect from 1-7-1939).
MacAuslin Chemboga	Sanitary Inspector, First Grade.

* Passed examination for Senior Hospital Assistant.

TABLE II.—FINANCIAL.

(See Section I. C.).

TABLE III.

RETURN OF STATISTICS OF POPULATION FOR THE YEAR 1939.

	Europeans and Whites	Africans	Asiatics
Number of Inhabitants 1939	1,953	1,676,600	1,656
Number of Births ,,	48	—	87
Number of Deaths ,,	11	—	17
Number of Immigrants ,,	—	—	—
Number of Inhabitants 1938	1,847	1,672,787	1,748
Decrease of population	—	—	92
Increase of population	106	3,813	—

TABLE IV.

SHOWING THE MAXIMUM, MINIMUM, AND MEAN TEMPERATURES (FAHR.) AND TOTAL RAINFALL IN VARIOUS DISTRICTS DURING THE YEAR 1939.

District.	Station.	Height above Sea Level.	Air Temperature.							Rain.			
			Means of		Means. of	Absolute Max. and Min.				Number of Days.	Total Fall Inches.	Maximum Fall in a Day.	
			A Max.	B Min.	A & B	Max.	Date.	Min.	Date.			Inches.	Date.
		Feet.											
Chikwawa	Chikwawa	127	92.8	76.9	84.9	104	14 Nov.	56	6 June	55	43.08	4.10	15 March
Cholo	Cholo	3,000	—	45.8	—	—	—	34	12 „	116	71.31	3.15	20 Jan.
Mlanje	Mlanje	2,400	88.3	57.3	72.8	100	17 Oct.	44	26 July	129	71.04	4.41	17 Nov.
Blantyre	Blantyre	3,500	77.1	59.5	68·3	89	28 Nov.	49	29 June	82	50.17	2.83	1 Dec.
Zomba	Zomba	3,020	78.4	61.0	69·7	93	14 „	49	22 July	133	60.43	4.37	15 March
Upper Shire	Liwonde	1,600	80.7	50.0	65.4	99	13 Oct.	34	15 „	78	41.45	2·55	18 Jan.
Ncheu	Ncheu	3,700	78·1	57.2	67.7	92	26 „	44	3 June	114	45.49	2.85	27 Dec.
South Nyasa	Fort Johnston	1,700	—	—	—	—	—	—	—	49	45.15	3.17	14 Jan.
Dedza	Dedza	5,250	73.2	55.9	64.6	89	21 Dec.	41	20 July	74	42.80	2.30	24 Dec.
Lilongwe	Lilongwe	3,400	81.0	44.2	62.6	94	9 Nov.	31	14 „	64	29.44	3.35	27 Jan.
Fort Manning	Fort Manning	4,228	81.2	55.1	68.2	92	14 „	40	18 June	95	45.49	2.50	2 Feb.
Dowa	Dowa	4,400	80.3	57.4	68.9	95	13 „	42	16 Sept.	77	33.71	2·56	24 Jan.
Kota Kota	Kota-Kota	1,800	86.4	65.2	75.8	100	29 Oct.	48	2 Aug.	73	52.36	8·52	18 March
Mzimba	Mzimba	4,500	79.5	—	—	88	16 „	—	—	42	41.83	2.70	19 Jan.
Dowa	Domira Bay	2,000	82.3	61.9	72.1	97	13 Nov.	44	24 July	88	34.66	1.44	31 Dec.
West Nyasa	Chinteche	1,800	81.8	62.7	72.3	96	6 Nov.	47	25 „	84	64.29	4.90	19 March

TABLE V.

Table Va.—Zomba, Blantyre and Lilongwe European Hospitals.
Return of Diseases and Deaths (European In-Patients) of the Year 1939.

Diseases.	Remaining at the end of 1938	Admissions during 1939			Total Cases Treated	Deaths	Remaining at the end of 1939
		Zomba	Blantyre	Lilongwe			
I. *Infectious and parasitic diseases*:							
1. (*a*) Typhoid fever ...	—	1	—	—	1	—	1
(*b*) Paratyphoid fever ...	—	—	2	—	2	—	—
(*c*) Type undefined ...	—	—	1	—	1	—	—
9. Diphtheria ...	—	—	1	—	1	1	—
10. Influenza ...	—	2	9	—	11	—	—
12. Dysentery:—							
(*a*) Amoebic ...	—	10	31	3	44	—	—
(*b*) Bacillary ...	—	1	—	—	1	—	—
19. Tuberculosis of the respiratory system ...	—	3	—	—	3	—	1
24. Malaria:—							
(*a*) Benign tertian ..	—	1	—	—	1	—	—
(*b*) Subtertian ...	—	9	6	—	15	—	—
(*c*) Quartan ...	—	2	—	—	2	—	—
(*d*) Unclassified ...	2	10	21	—	33	—	1
33. Other infectious and/or parasitic diseases ...	—	1	1	—	2	—	—
II. *Cancers and other tumours*:							
34. Cancers and other tumours—							
(*a*) Malignant ...	—	—	4	—	4	2	—
(*b*) Non-malignant ...	—	1	—	—	1	—	—
(*c*) Undetermined ...	—	—	1	—	1	—	—
III. *Rheumatism, diseases of nutrition and of endocrine glands and other general diseases*:							
36. Diabetes ...	—	1	—	—	1	—	—
IV. *Diseases of the blood and blood forming organs:*							
41. Diseases of the blood and blood forming organs:—							
(*a*) Leukaemia ...	—	1	—	—	1	—	—
V. *Acute and chronic poisoning*:							
42. Acute and chronic poisoning ...	—	—	1	—	1	—	—
VI. *Diseases of the nervous system and sense organs*:							
44. Other diseases of the nervous system ...	—	4	2	—	6	—	—
45. Trachoma ...	—	1	—	—	1	—	—
46. Other diseases of the eye and adnexa ...	—	3	—	—	3	—	—
47. Diseases of the ear and mastoid sinus ..	—	1	—	—	1	—	—
VII. *Diseases of the circulatory system*:							
48. Diseases of the circulatory system:—							
(*a*) Heart diseases ...	—	1	—	—	1	1	—
(*b*) Other circulatory diseases	1	2	1	—	4	—	—
Carried forward	3	55	81	3	142	4	3

Table Va—Continued.

Diseases.	Remaining at the end of 1938	Admissions during 1939			Total Cases Treated	Deaths	Remaining at the end of 1939
		Zomba	Blantyre	Lilongwe			
Brought forward ...	3	55	81	3	142	4	3
VIII. *Diseases of the respiratory system :*							
49. Bronchitis ...	—	2	1	—	3	—	—
50. Pneumonia :—							
(*a*) Broncho-pneumonia ...	—	—	1	—	1	—	—
(*b*) Lobar-pneumonia ...	—	—	—	1	1	—	—
51. Other diseases of the respiratory system ...	—	1	2	1	4	—	—
IX. *Diseases of the digestive system :*							
52. Diarrhoea and enteritis :—							
(*a*) Diarrhoea under 2 years ...	—	1	—	—	1	—	—
(*b*) „ over 2 years ..	—	1	1	—	2	—	—
53. Appendicitis ...	1	4	5	—	10	2	—
56. Other diseases of the liver and biliary passages ...	—	1	4	—	5	—	—
57. Other diseases of the digestive system ...	—	8	14	—	22	—	1
X. *Non-venereal diseases of the genito-urinary system :*							
59. Other non-venereal diseases of the genito-urinary system ...	1	9	4	1	15	—	—
XI. *Diseases of pregnancy, child-birth, and the puerperal state :*							
60. Diseases of pregnancy, childbirth, and the puerperal state :—							
(*a*) Abortion ...	—	2	1	—	3	—	—
(*b*) Toxaemias of pregnancy ...	—	—	1	—	1	—	—
(*c*) Other conditions of the puerperal state ...	—	9	23	—	32	—	—
XII. *Diseases of the skin, cellular tissue, bones and organs of locomotion :*							
61. Diseases of the skin, cellular tissue, bones and organs of locomotion ...	—	6	13	1	20	—	2
XVII. *Affections produced by external causes :*							
64. External causes—							
(*b*) Other forms of violence ...	2	13	5	—	20	—	—
XVIII. *Ill-defined diseases :*							
65. Ill-defined diseases ...	—	17	3	—	20	—	—
Total ...	7	129	159	7	302	6	6

TABLE V.

TABLE Vb. RETURN OF DISEASES AND DEATHS (NATIVE IN-PATIENTS) FOR THE YEAR 1939.

(INCLUDING ASIATICS, NATIVE OFFICIALS, K.A.R. NATIVE RANKS, NATIVE GENERAL POPULATION, ASIATIC AND NATIVE CONVICTS).

Diseases.	Remaining at the end of 1938	Admissions during 1939	Total Cases Treated	Deaths	Remaining at the end of 1939
I. *Epidemic, endemic and infectious diseases :*					
1. Enteric group:—					
(*a*) Typhoid fever	1	7	8	—	—
(*b*) Type undefined	—	1	1	—	—
3. Relapsing fever	5	106	111	2	9
5. Small-pox	—	3	3	—	—
6. Measles	1	26	27	—	—
7. Scarlet fever	—	1	1	—	—
8. Whooping cough	—	20	20	—	1
9. Diphtheria	—	1	1	1	—
10. Influenza	1	121	122	—	2
12. Dysentery:—					
(*a*) Amoebic	5	160	165	11	10
(*b*) Bacillary	—	2	2	—	—
(*c*) Unclassified	—	7	7	—	—
14. Acute poliomyelitis	—	10	10	—	3
16. Cerebro-spinal fever	3	70	73	27	2
18. Tetanus	—	3	3	2	—
19. Tuberculosis of the respiratory system	12	111	123	13	8
20. Other tuberculous diseases	11	68	79	3	10
21. Leprosy	2	59	61	1	15
22. Venereal diseases—					
(*a*) Syphilis	72	1,280	1,352	8	63
(*b*) Gonorrhoea	13	376	389	2	32
24. Malaria:—					
(*a*) Benign tertian	7	95	102	2	3
(*b*) Subtertian	13	605	618	13	10
(*c*) Quartan	2	21	23	2	—
(*d*) Unclassified	15	556	571	5	10
25. Blackwater fever	—	4	4	1	—
27. Trypanosomiasis	3	12	15	—	1
28. Yaws	14	227	241	—	12
30. Ankylostomiasis	64	1,326	1,390	6	70
31. Schistosomiasis	21	529	550	2	—
32. Other helminthic diseases	—	74	74	—	40
33. Other infectious and/or parasitic diseases	7	68	75	4	4
II. *Cancer and other tumours :*					
34. Cancer and other tumours:—					
(*a*) Malignant	2	39	41	8	3
(*b*) Non-malignant	3	109	112	3	—
(*c*) Undetermined	1	2	3	—	—
III. *Rheumatism, diseases of nutrition and of the endocrine glands and other general diseases :*					
35. Rheumatic conditions	8	85	93	—	7
36. Diabetes	—	3	3	—	—
38. Beri-beri	—	3	3	—	—
39. Pellagra	3	17	20	—	1
40. Other diseases:—					
(*a*) Nutritional	—	2	2	—	—
(*b*) Endocrine glands and general	—	14	14	2	—
IV. *Diseases of the blood and blood-forming organs :*					
41. Diseases of the blood and blood-forming organs	4	53	57	6	3
V. *Acute and chronic poisoning :*					
42. Acute and chronic poisoning	—	4	4	1	1
Carried forward	293	6,280	6,573	125	320

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1938	Admissions during 1939	Total Cases Treated	Deaths	Remaining at the end of 1939
Brought forward					
VI. *Diseases of the nervous system and sense organs:*	293	6,280	6,573	125	320
43. Cerebral haemorrhage	3	1	4	1	3
44. Other diseases of the nervous system ...	3	106	109	6	1
45. Trachoma	2	19	21	—	—
46. Other diseases of the eye and adnexa ...	21	393	414	—	17
47. Diseases of the ear and mastoid sinus ...	2	49	51	2	1
VII. *Diseases of the circulatory system:*					
48. Diseases of the circulatory system—					
(*a*) Heart diseases ...	3	44	47	7	1
(*b*) Other circulatory diseases ...	3	66	69	4	8
VIII. *Diseases of the respiratory system:*					
49. Bronchitis ...	6	205	211	1	—
50. Pneumonia—					
(*a*) Broncho-pneumonia ...	4	84	88	16	—
(*b*) Lobar-pneumonia ...	6	197	203	26	—
(*c*) Otherwise defined ...	1	11	12	—	—
51. Other diseases of the respiratory system ...	3	109	112	1	14
IX. *Diseases of the digestive system:*					
52. Diarrhoea and enteritis—					
(*a*) Under 2 years of age ..	—	68	68	5	4
53. Appendicitis ...	2	19	21	—	2
54. Hernia, intestinal obstruction ...	3	96	99	8	5
55. Cirrhosis of the liver ...	—	6	6	3	—
56. Other diseases of the liver and biliary passages	1	29	30	3	—
57. Other diseases of the digestive system ...	5	361	366	8	11
X. *Non-venereal diseases of the genito-urinary system:*					
58. Nephritis (all forms)—					
(*a*) Acute ...	2	15	17	2	2
(*b*) Chronic	1	9	10	—	—
59. Other non-venereal diseases of the genito-urinary system ..	7	260	267	3	10
XI. *Diseases of pregnancy, childbirth, and the puerperal state:*					
60. Diseases of pregnancy, childbirth, and the puerperal state:—					
(*a*) Abortion ...	—	28	28	—	—
(*c*) Toxaemias of pregnancy ...	1	9	10	3	—
(*d*) Other conditions of the puerperal state ...	4	235	239	8	5
XII. *Diseases of the skin, cellular tissue, bones and organs of locomotion:*					
61. Diseases of the skin, cellular tissue, bones and organs of locomotion ...	97	2,484	2,581	14	136
XIV. *Congenital malformations and diseases of early infancy:*					
62. Congenital malformation and diseases of early infancy:—					
(*a*) Congenital debility (children under one year) ...	—	9	9	—	—
/ *Carried forward*	473	11,192	11,665	246	540

TABLE Vb.—Continued.

Diseases.	Remaining at the end of 1938	Admissions during 1939	Total Cases Treated	Deaths	Remaining at the end of 1939
Brought forward ...	473	11,192	11,665	246	540
(*b*) Premature birth ...	—	1	1	—	—
XVI. *Senility*:					
63. Senility ...	—	6	6	2	—
XVII. *Affections produced by external causes*:					
64. External causes:—					
(*a*) Suicide ...	—	2	2	—	—
(*b*) Other forms of violence ...	56	1,507	1,563	37	105
XVIII. *Ill-defined Diseases*:					
65. Ill-defined ...	8	267	275	9	9
TOTAL ...	537	12,975	13,512	294	654

TABLE VI.

TABLE VIa.—RETURN OF DISEASES (EUROPEAN OUT-PATIENTS) FOR THE YEAR 1939.

Diseases	M.	F.
I. *Infectious and parasitic diseases*		
1. Enteric Group.		
(*a*) Typhoid fever	1	—
(*b*) Paratyphoid fever	1	1
(*c*) Type undefined	1	—
8. Whooping cough	1	1
9. Diphtheria	2	—
10. Influenza	22	10
12. Dysentery—		
(*a*) Amoebic	41	34
(*b*) Bacillary	2	1
(*c*) Unclassified	2	—
18. Tetanus	—	1
19. Tuberculosis of respiratory system	3	—
20. Other tuberculous diseases	—	1
22. Venereal diseases—		
(*a*) Syphilis	3	—
(*b*) Gonorrhoea	15	1
(*c*) Other venereal diseases	1	—
24. Malaria—		
(*a*) Benign tertian	8	4
(*b*) Subtertian	37	9
(*c*) Quartan	2	—
(*d*) Undefined	77	51
30. Ankylostomiasis	3	—
32. Other helminthic diseases	3	—
33. Other infectious and/or parasitic diseases	2	6
II. *Cancer and other tumours.*		
34. Cancer and other tumours—		
(*a*) Malignant	2	3
(*b*) Non-malignant	7	—
(*c*) Undetermined	—	6
III. *Rheumatism diseases of Nutrition and of the endocrine glands and other general diseases.*		
35. Rheumatic conditions	5	1
36. Diabetes	—	1
40. Other diseases—		
(*a*) Endocrine glands and general	—	2
IV. *Diseases of the blood and blood-forming organs.*		
41. Diseases of the blood and blood-forming organs	8	34
V. *Acute and chronic poisoning.*		
42. Acute and chronic poisoning	1	—
VI. *Diseases of the nervous system and sense organs.*		
43. Cerebral haemorrhage	3	—
44. Other diseases of the nervous system	21	26
45. Trachoma	—	2
46. Other diseases of the eye and adnexa	25	15
Carried forward	299	210
Brought forward	299	210
47. Diseases of the ear and mastoid sinus	53	25
VII. *Diseases of the circulatory system—*		
48. Diseases of the circulatory system—		
(*a*) Heart diseases	11	4
(*b*) Other circulatory diseases	20	18
VIII. *Diseases of the respiratory system—*		
49. Bronchitis	28	15
50. Pneumonia—		
(*a*) Broncho-pneumonia	1	—
(*b*) Lobar-pneumonia	1	—
51. Other diseases of the respiratory system	52	35
IX. *Diseases of the digestive system.*		
52. Diarrhoea and enteritis—		
(*a*) Under 2 years of age	4	5
(*b*) Over 2 ,, ,, ,,	21	10
53. Appendicitis	10	2
54. Hernia, intestinal obstruction	2	—
56. Other diseases of the liver and biliary passages	—	7
57. Other diseases of the digestive system	98	71
X. *Non-veneral diseases of the genito-urinary system*		
59. Other non-venereal diseases of the genito-urinary system	12	73
XI. *Diseases of pregnancy, childbirth, and the puerperal state.*		
60. Diseases of pregnancy, childbirth, and the puerperal state :—		
(*a*) Abortion	—	8
(*c*) Toxæmias of pregnancy	—	2
(*d*) Other conditions of the puerperal state	—	32
XII. *Diseases of the skin, cellular tissue, bones aud organs of locomotion.*		
61. Diseases of the skin, cellular tissue, bones and organs of locomotion	122	64
XVII. *Affections produced by external causes.*		
64. External causes :—		
(*b*) Other forms of violence	90	34
XVIII. *Ill-defined diseases*		
65. Ill-defined	37	43
Total	861	658

TABLE VI.

TABLE VIb. RETURN OF DISEASES (NATIVE OUT-PATIENTS) FOR THE YEAR 1939. (INCLUDING ASIATICS, NATIVE OFFICIALS, K. A. R. NATIVE RANKS, NATIVE GENERAL POPULATION, ASIATIC AND NATIVE CONVICTS).

Diseases.	Hospital Out-Patients		Rural Dispensaries	
	Males	Females	Males	Females
I. Epidemic, endemic and infectious diseases:				
1. Enteric Group				
(*a*) Typhoid fever	5	2	—	—
(*b*) Type undefined	1	—	—	—
3. Relapsing fever	115	18	106	71
4. Undulant fever ...	17	—	—	—
5. Small-pox	3	—	4	13
6. Measles	32	9	72	73
7. Scarlet fever ...	—	1	—	—
8. Whooping cough	95	122	617	547
9. Diphtheria ...	1	—	—	—
10. Influenza	676	328	1,867	1,060
12. Dysentery:—				
(*a*) Amoebic	152	54	—	—
(*b*) Bacillary	2	—	—	—
(*c*) Unclassified	54	16	723	500
13. Plague:—				
(*a*) Bubonic	—	—	1	—
14. Acute poliomyelitis	12	4	—	—
16. Cerebro-spinal fever	43	27	21	17
18. Tetanus	3	2	—	—
19. Tuberculosis of the respiratory system ...	114	20	—	—
20. Other tuberculous diseases ...	70	20	4	2
21. Leprosy	106	22	99	103
22. Venereal diseases—				
(*a*) Syphilis ...	1,155	1,033	287	255
(*b*) Gonorrhoea	484	166	7	—
(*c*) Other venereal diseases ...	72	3	186	53
24. Malaria—				
(*a*) Benign tertian	271	84	—	—
(*b*) Subtertian	1,492	734	—	—
(*c*) Quartan ...	62	36	—	—
(*d*) Unclassified	4,027	2,247	8,129	5,301
25. Blackwater fever	3	1	—	—
27. Trypanosomiasis	8	5	—	—
28. Yaws	463	342	1,027	726
30. Ankylostomiasis	5,215	2,615	3,555	3,538
31. Schistosomiasis	3,484	1,008	2,323	831
32. Other helminthic diseases ...	535	281	1,265	1,044
33. Other infectious and/or parasitic diseases ...	125	36	486	387
II. Cancer and other tumours.				
34. Cancer and other tumours—				
(*a*) Malignant	22	22	—	—
(*b*) Non-malignant	109	70	43	19
(*c*) Undetermined	1	1	29	23
III. Rheumatism, diseases of nutrition and of endocrine glands and other general diseases:				
35. Rheumatic conditions	577	315	1,787	1,212
36. Diabetes	5	—	—	—
37. Scurvy	2	—	—	—
38. Beri-beri	3	—	—	—
39. Pellagra	16	12	—	—
40. Other diseases—				
(*a*) Nutritional	—	2	—	—
(*b*) Endocrine glands and general ...	14	17	—	—
IV. Diseases of the blood and blood-forming organs.				
41. Diseases of the blood and blood-forming organs	46	42	269	243
V. *Acute and chronic poisoning.* ...	5	—	—	—
Carried forward	19,697	9,717	22,907	16,018

TABLE VIb.—Continued.

Diseases.	Hospital Out-Patients Males	Hospital Out-Patients Females	Rural Dispensaries. Males	Rural Dispensaries. Females
Brought forward	19,697	9,717	22,907	16,018
VI. *Diseases of nervous system and sense organs* :				
43. Cerebral haemorrhage ...	—	1	—	—
44. Other diseases of the nervous system ...	319	90	95	71
45. Trachoma ...	48	42	—	—
46. Other diseases of the eye and adnexa ...	3,973	3,639	12,495	13,615
47. Diseases of the ear and mastoid sinus ...	1,693	937	5,906	4,340
VII. *Diseases of the circulatory system* :				
48. Diseases of the circulatory system—				
(*a*) Heart diseases ...	49	26	63	43
(*b*) Other circulatory diseases ...	115	44	1	—
VIII. *Diseases of the respiratory system* :				
49. Bronchitis ...	9,636	4,425	31,302	13,737
50. Pneumonia—				
(*a*) Broncho-pneumonia ...	63	39	6	2
(*b*) Lobar-pneumonia ...	175	50	3	3
(*c*) Otherwise defined ...	5	6	343	293
51. Other diseases of the respiratory system	6,087	3,067	19,235	12,049
IX. *Diseases of the digestive system* :				
52. Diarrhoea and enteritis—				
(*a*) Under 2 years of age ...	347	246	2,634	2,157
(*b*) Over 2 " " " ...	802	454	2,886	2,128
53. Appendicitis ...	25	3	1	—
54. Hernia, intestinal obstruction ...	138	—	4	—
55. Cirrhosis of the liver ...	6	1	—	—
56. Other diseases of the liver and biliary passages ...	45	14	42	44
57. Other diseases of the digestive system ...	10,590	5,832	35,157	23,257
X. *Non-venereal diseases of the genito-urinary system* :				
58. Nephritis (all forms)—				
(*a*) Acute ...	10	2	—	—
(*b*) Chronic ...	12	2	—	—
59. Other non-venereal diseases of the genito-urinary system ...	301	217	33	300
XI. *Diseases of pregnancy, childbirth, and the puerperal state* :				
60. Diseases of pregnancy, childbirth, and the puerperal state—				
(*a*) Abortion ...	—	29	—	—
(*c*) Toxaemias of pregnancy ...	—	11	—	—
(*d*) Other conditions of the puerperal state ...	—	361	—	8
XII. *Diseases of the skin, cellular tissue, bones and organs of locomotion* :				
61. Diseases of the skin, cellular tissue, bones and organs of locomotion ...	20,093	8,467	57,849	34,989
XIV. *Congenital malformations and diseases of early infancy* :				
62. Congenital malformations and diseases of early infancy—				
(*a*) Congenital debility (children under 1 year) ...	17	7	—	—
(*b*) Premature birth (do) ..	—	1	—	—
(*c*) Injury at birth (do) ...	—	1	—	—
XVI. *Senility* :				
63. Senility ...	11	2	—	—
XVII. *External causes* :				
64. External causes—				
(*a*) Suicide ...	1	1	—	—
(*b*) Other forms of violence ...	16,921	3,705	49,539	18,370
XVIII. *Ill-defined* :				
65. Ill-defined ...	2,758	934	9,003	4,294
TOTAL ...	93,937	42,373	249,504	145,718

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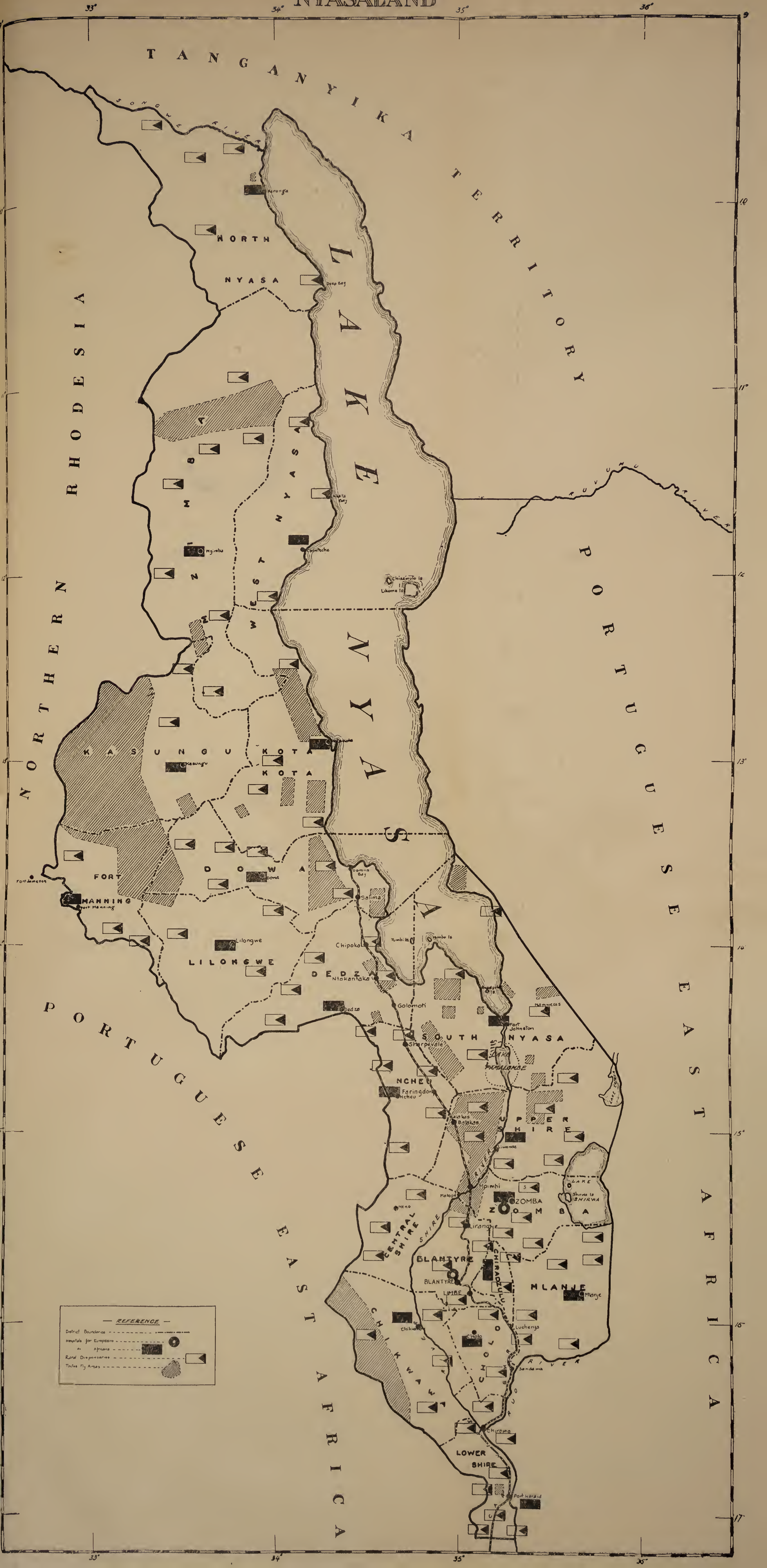
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TANGANYIKA TERRITORY
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Karonga
NORTH
NYASA
Deep Bay
LAKE NYASA
NORTHERN RHODESIA
M'BWANI
WEST NYASA
Nkata Bay
Chinteche
Mzimba
Chisamulo Is
Likoma Is
RUVUMA RIVER
PORTUGUESE EAST AFRICA
KASUNGU
Kasungu
KOTA KOTA
Kota Kota
FORT MANNING
Fort Jameson
Fort Manning
DOWA
Dowa
Domira Bay
Salima
LILONGWE
Lilongwe
Chipoka
Tumbi Is
Bomba Is
DEDZA
Ntakataka
Dedza
Golomoti
SOUTH NYASA
Fort Johnston
Makanjiras
Sharpevale
MALOMBE
NCHEU
Ncheu
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Balaka
UPPER SHIRE
Liwonde
LAKE CHIUTA
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Matope
Neno
ZOMBA
Zomba
LAKE SHIRWA
Shirwa Is
CENTRAL SHIRE
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BLANTYRE
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Limbe
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MLANJE
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